THE

# AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1870.

## A CONTRIBUTION TO OUR KNOWLEDGE OF THE CHEMICAL COMPOSITION OF GELSEMIUM SEMPERVIRENS.

*Case of fatal poisoning by three drachms of the fluid extract, and recovery of the poison some months after death.*

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Having recently been solicited to make a chemical examination of the contents of the stomach of a woman who, it was claimed, had administered to her, through the mistake of a druggist, a quantity of the fluid extract of gelsemium* and died from its effects, we found it necessary, before undertaking the examination, to ascertain whether this substance really contained any principle or principles by which its presence could be certainly determined. For this purpose, we made a series of experiments upon the fluid extract of gelsemium, prepared by Tilden & Co., and found it to contain a new organic acid, which may be denominated *gelseminic acid*, and a strongly basic or

EXPLANATIONS OF THE PLATE

*Illustrating Dr. Wormley's paper on Gelsemium sempervirens.*

Fig. 1. Gelseminic acid from ethereal solution, × 20 diameters.

" 2. " " hot supersaturated aqueous solution, × 75 diameters.

" 3, 4, 5. Gelseminic acid, sublimed, × 75 diameters.

" 6. Gelseminic acid, precipitated by corrosive sublimate, × 75 diameters.

* A concentrated tincture of the root of Gelsemium of the strength of 480 grains to each fluidounce.—Editor.

alkaloidal principle, which, being the active principle of the drug, may be named *gelseminine*, *gelseminia* or *gelsemia*.

It has been known for some years that this drug contained a very active poisonous principle, but, so far as we are aware, the only published accounts relating to its chemical properties are the two heretofore published in this Journal: the first by H. Kollock, May 1855, p. 197, and the other by C. L. Eberle, January, 1869, p. 35. Neither of these experimentalists, however, satisfactorily succeeded in isolating and ascertaining the chemical properties of this principle.

Before entering into the details of the above case of poisoning, the methods by which the new acid and base may be obtained, together with their respective chemical properties, will be pointed out.

## I. Gelseminic Acid.

*Preparation.*—Gelseminic acid may be obtained from the fluid extract of gelsemium by the following method: Concentrate the fluid extract on a water-bath to about one-eighth of its volume, then add to the concentrated extract several times its volume of pure water and allow the mixture to stand several hours, or at least until the supernatant liquid has become very nearly or altogether clear. By this treatment most of the resinous matter, held in solution by the alcohol originally present, will be separated. The mixture is then transferred to a filter, the solids well washed with water, and the filtrate thus obtained, together with the washings, concentrated on a water-bath to about the same volume the concentrated extract had prior to the addition of the pure water. The concentrated liquid, after filtration, if necessary, is acidulated with hydrochloric acid in the proportion of one drop of the pure acid for each fluid ounce of the fluid extract operated upon, then thoroughly agitated with about twice its volume of ether; after the liquids have completely separated, the ethereal fluid is decanted and the aqueous solution again agitated with a similar quantity of ether, which in its turn is decanted and the aqueous liquid finally washed with about its own volume of ether.

On allowing the united ethereal liquids thus obtained to evapo-

rate spontaneously, the gelseminic acid will be left chiefly in the form of nearly colorless groups of crystals, of the forms illustrated in plate, fig. 1, together with more or less yellowish or brownish resinous matter. The crystals may be washed with a small quantity of cold absolute alcohol, which will readily dissolve the adhering coloring matter without acting much upon the crystals themselves. The alcohol thus employed may be evaporated spontaneously, when a second crop of crystals will be obtained; these are also washed with alcohol and added to the former crystals. To further purify the crystals, they are diffused in a small quantity of hot water and extracted from the cooled mixture by chloroform, which on spontaneous evaporation will leave them very nearly or altogether colorless.

To recover and purify the gelseminic acid taken up and held in solution by the alcohol employed to wash the above crystals, the liquid is evaporated to dryness and the residue treated with a small quantity of water, and sufficient caustic potash added to just neutralize the liquid, by which the organic acid will be dissolved in the form of a salt of the alkali. This solution is filtered, the filtrate treated with slight excess of basic acetate of lead, and the precipitate, consisting of the gelseminate of lead, collected on a filter and washed. The washed residue is diffused in an appropriate quantity of water and treated with excess of sulphuretted hydrogen gas, which will decompose the lead-salt with the precipitation of the metal as sulphuret and the elimination of the organic acid. This mixture is heated to about the boiling temperature, to dissolve the organic acid, and filtered while still hot, and the residue washed with a little alcohol, which is collected with the first filtrate. The filtrate may now be concentrated and the organic acid extracted by chloroform, which on spontaneous evaporation will leave it in its crystalline state.

As the average of several experiments, after the above method, sixteen ounces of the fluid extract of gelsemium yielded about two grains and a quarter of pure gelseminic acid.

*Chemical Properties.*—In its pure state, gelseminic acid is a colorless, odorless, nearly tasteless solid, which is readily crystallizable, usually forming groups or tufts of delicate needles. It

has strongly acid properties, completely neutralising bases and uniting with them to form salts, most of which, excepting those of the alkalies, are at most only sparingly soluble in water. The salts of the acid having an alkaline base, are very freely soluble in water and are crystallisable. The pure acid is freely soluble both in chloroform and in ether, but only sparingly soluble in water, requiring about one thousand times its weight of this liquid for solution. It is much more freely soluble in hot water, from which, however, the excess immediately begins to separate, in the form of long slender needles, as the solution cools. Plate, fig. 2.

If a small quantity of gelseminic acid, or of any of its salts in the solid state, be treated with a drop of concentrated *nitric acid*, it dissolves under a yellow coloration to a yellow, reddish or red solution, the final color depending upon the relative quantity of the organic acid present. If this solution be now treated with excess of ammonia, it acquires a deep blood-red color, which is permanent, at least for some hours. $\frac{1}{100}$th of a grain of the acid, when treated after this manner, will yield a deep blood-red coloration; $\frac{1}{1000}$th grain yields a similar coloration. The $\frac{1}{10.000}$th of a grain of the acid yields, under the action of nitric acid, a well-marked yellow coloration, which under the action of ammonia assumes a pale-red hue. The nitric acid solution of even the $\frac{1}{50.000}$th of a grain of the organic acid acquires, when treated with ammonia, a distinct reddish coloration. The production of this red coloration is highly characteristic of the organic acid.

*Sulphuric acid* dissolves the organic acid, as also most of its salts, under the production of a yellow color, to a brown or reddish-brown solution, which, upon the application of a moderate heat, acquires a dark chocolate color. The addition of bichromate of potash to a sulphuric acid solution of the organic acid, causes no striking change.

*Hydrochloric acid* has little or no action upon the organic acid.

*Caustic Potash, Soda or Ammonia*, when added to gelseminic acid, causes it to assume an intense yellow color, and quickly dis-

solves it, in the form of a salt, to a solution having very striking fluorescent properties, even when very highly diluted. A solution of this kind containing $\frac{1}{100}$ of its weight of the acid, when examined in a small glass tube by transmitted light, has a strong yellow color; under reflected light, a deep bluish appearance; and under a cone of sun-light condensed upon it with an ordinary hand lens, an intense blue color along the path of the condensed rays.

When the solution contains $\frac{1}{1000}$th of its weight of the acid, it presents, under transmitted light, a greenish-yellow appearance, the surface of the liquid at the same time appearing of a deep blue color; by reflected light, it presents a strong greenish-blue, and under condensed light, a deep blue coloration.

A 10,000th solution of the acid presents, under transmitted light, only a faint yellowish hue, with a blue surface; but under reflected light it appears of a deep blue color, even more intense than a 1000th solution.

A 100,000th solution is colorless, or at most presents only a faint bluish hue under transmitted light; under reflected sun-light, however, it presents a strongly marked blue appearance; and when examined by condensed sun-light, the path of the condensed beam, as it passes through the solution, presents a deep blue appearance. This blue coloration is also observed by looking down the tube containing the solution upon the surface of the liquid. Even one grain of such a solution, when contained in the end of a pipette and examined under condensed sun-light, exhibits a very distinct blue appearance.

Solutions more dilute than the last mentioned appear nearly or altogether colorless under transmitted and reflected light; but even a single drop of a solution containing only the $\frac{1}{1,000,000}$th part of its weight of the acid, when contained in the end of a pipette and examined under a cone of condensed sun-light, presents a quite perceptible blue coloration along the path of the condensed rays.

If a large test tube, or any similar vessel, nearly filled with water, be placed against a black ground in direct sun-light, and view obliquely from the front, and then a drop of an alkaline solution of the organic acid be dropped into the tube, a very

beautiful deep blue coloration will manifest itself along the path of the drop as it slowly diffuses itself through the water, especially if the diffusion be observed under a cone of condensed sun-light. A single drop of a 10,000th solution of the acid, when examined in this manner, yields an intense blue coloration along the path of the alkaline liquid. Even a drop of a 100,000th solution gives rise to a very satisfactory blue coloration.

The commercial fluid extract of gelsemium, when rendered alkaline and diluted with water, presents appearances, in regard to color, similar to those above described, even if the extract be largely diluted. Thus, if the extract be rendered alkaline, and diluted with one hundred parts of water, the mixture presents a strongly marked blue appearance when examined by looking into the tube containing the mixture. Even when diluted with one thousand parts of water, it still presents, under condensed light, a very distinct blue coloration, even if only a few drops of the mixture be examined.

In respect to the manifestation of a blue appearance under the action of light, solutions of gelseminic acid resemble somewhat those of quinine, with, however, this marked difference, that in the case of the latter substance the coloration is only observed when the solution has an acid reaction, whereas in the case of gelseminic acid the coloration manifests itself only in the presence of an alkali, the bluish appearance immediately disappearing on the addition of an excess of an acid.

When cautiously heated upon platinum foil, pure gelseminic acid fuses to a colorless liquid, which, as the heat is increased, darkens in color, gives off white fumes and is finally dissipated without residue.

If a small quantity of the crystallized acid be placed within a glass ring which is attached to a glass slide, and the latter be gradually heated on an iron plate placed over a Bunsen burner, the acid undergoes no change until heated considerably above 212° F., when it volatilizes without fusion or change of color. If the vapors thus produced be received upon a warmed glass slide or cover placed upon the glass ring, they condense in the form of brilliant, transparent crystals of one or more of the

forms illustrated in plate, figs. 3, 4 and 5, their exact character depending on the relative amount of substance present and the temperature employed. For the success of this experiment it is necessary that only a very minute quantity of the organic acid be employed. The $\frac{1}{100}$th of a grain of the acid will furnish quite a number of fine crystalline sublimates. Very satisfactory sublimates may be obtained from the acid, even when contaminated with comparatively large quantities of foreign organic matter.

The true nature of the gelseminic acid sublimate may be established by treating it with a drop of water containing a trace of ammonia, when it will dissolve to a solution having the optical properties already described. So, also, its nature may be determined by dissolving it in a small drop of nitric acid and then adding to the yellow solution an excess of ammonia, when a deep or orange-red coloration will manifest itself.

*Reactions of Solutions of Gelseminic Acid.*—Solutions of the salts of gelseminic acid have a slightly astringent taste and are colorless, excepting an alkali be present, when, as already pointed out, they present a bluish appearance. They are readily decomposed by free acids, with the elimination of the organic acid, which, if the solution contains $\frac{1}{500}$th or more of its weight of the acid, separates in the form of delicate crystalline needles.

Since the gelseminates of the metals proper are nearly all insoluble in water, the acid is precipitated, from its combinations with an alkali, by solutions of most of the metallic salts, being thrown down in the form of a salt.

1. *Acetate of Lead* throws down from solutions of the acid a yellow amorphous precipitate, which is readily soluble in free acids, even in acetic acid, with the separation of the organic acid. $\frac{1}{100}$th of a grain of the acid in one grain of water, yields with the reagents a very copious deposit; $\frac{1}{1000}$th grain gives a very decided precipitate.

2. *Corrosive Sublimate* produces in solution of the acid a yellowish filmy precipitate. After a little time, at least when from tolerably strong solutions, the precipitate becomes partly, at least, converted into colorless crystalline needles, plate, fig. 6, due perhaps to the separation of the organic acid. The pre-

cipitate is readily soluble in free acids, and its nature may be confirmed by addition of excess of nitric acid and then of ammonia.

*Nitrate of Suboxide of Mercury* also precipitates the acid in the form of a dirty yellow deposit.

3. *Nitrate of Silver* produces in solution of the acid a yellow or brownish-yellow precipitate, which slowly acquires a nearly or altogether black color and is then insoluble in nitric acid. The 1-100th of a grain of the acid yields a very copious precipitate. 1-1000th grain yields at first only a faint turbidity, but in a little time there is a quite copious black or bluish-black precipitate. 1-10,000th grain will yield after some minutes a good black deposit; and after several minutes, one drop of a 50-000th solution of the acid will acquire a distinct purplish or blackish color.

4. *Sulphate of Copper* throws down from tolerably strong solutions of the acid a brownish-red precipitate, which quickly acquires a dull red color, and after a time becomes partly granular and crystalline. The precipitate is readily decomposed by free acids with the elimination of the organic acid.

5. *Sulphate of Iron* produces in solutions of the acid, when not too dilute, a black precipitate which quickly becomes brown, and after a time masses of colorless crystalline needles appear.

6. *Chloride of Gold* occasions a deep green precipitate, quickly becoming bluish and appearing black by reflected light. The precipitate is insoluble in acetic acid. 1-1000th of a grain of the acid yields a good bluish deposit.

7. *Bichloride of Platinum* produces, in strong solutions of the acid, a dirty yellow amorphous precipitate, which is insoluble in acetic acid, and after a time becomes granular.

8. A solution of *bromine in bromohydric acid* throws down from a drop of a 100th solution of the acid a copious greenish precipitate, which quickly acquires a bluish, then a dark grey color. One drop of a 1,000th solution yields a decided green precipitate, which finally acquires a deep blue color.

9. *Iodine* in solution of *Iodide of Potassium* produces in solutions of the acid, when not very dilute, a copious reddish-

brown deposit, which after a time assumes a dark green color. The precipitate is insoluble in acetic acid.

Solutions containing more than 1-100th of their weight of the acid will also yield precipitates with the soluble neutral salts of lime, nickel, cobalt and tin.

## II. GELSEMININE.

*Preparation.*—Gelseminine may be extracted from the concentrated extract from which gelseminic acid has been extracted by ether, by rendering the liquid slightly alkaline with potash, and then repeatedly agitating it with chloroform, which will dissolve the alkaloid together with more or less foreign matter. For this purpose, about two volumes of chloroform may at first be employed, and after this has been separated, the operation repeated with a similar quantity of the fluid, when finally the alkaline solution is washed with about its own volume of the liquid. It sometimes happen, especially if the mixture has been violently agitated for some minutes, that the liquids form an emulsion from which the chloroform does not entirely separate for many hours. The separation may usually be facilitated by moderately warming the mixture and gently agitating it.

The chloroform employed for these extractions is collected in a dish and evaporated at a very moderate temperature, when it will leave a hard, gum-like, yellowish or brownish-yellow residue. This is treated with a small quantity of water and the mixture slightly acidulated with hydrochloric acid, which will dissolve the alkaloid together with more or less foreign matter. This solution is filtered, and the filtrate concentrated to about one-sixteenth the volume of the original fluid extract operated upon. On now treating the concentrated liquid with slight excess of caustic potash, the alkaloid will be precipitated in the form of a more or less white deposit. This is collected on a filter, washed with a small quantity of pure water, then allowed to dry at the ordinary temperature. On drying, the precipitate will shrink greatly in volume and acquire a dark color.

For the purpose of further purifying the alkaloid, the dry mass is pulverized and the brownish powder dissolved, by the aid of a few drops of hydrochloric acid, in a small quantity of

water, from which it is re-precipitated by slight excess of caustic potash and then extracted from the mixture by ether, which, on spontaneous evaporation, will leave it in the form of a very hard, brittle, transparent mass, strongly adhering to the watch-glass or other vessel in which the evaporation was effected. On carefully detaching the residue and pulverising it, it will form a nearly or altogether colorless powder. If the powder is still colored, it may be again dissolved and extracted by ether.

Since the alkaloid is not altogether insoluble in water, a very notable quantity will remain in the filtrate from which the precipitate produced by potash was separated. This may be recovered by precipitating it with a solution of iodine in iodide of potassium, collecting and washing the precipitate, then dissolving it in alcohol, and precipitating the iodine by the cautious addition of nitrate of silver, which will throw it down as iodide of silver, whilst the alkaloid will remain in solution in the form of nitrate. The solution is then concentrated to expel the alcohol, diluted with water, filtered, and the filtrate evaporated at a moderate temperature, when the nitrate will be left in its pure state. The alkaloid may readily be recovered from the nitrate by dissolving it in water, adding slight excess of a free alkali, and then extracting the liberated base by ether or chloroform.

Instead of employing the foregoing method for the recovery of the alkaloid from the above filtrate, the liquid may be slightly acidulated, then concentrated to a small volume, again rendered alkaline, and the alkaloid extracted directly by ether. To obtain it pure by this method, however, will require at least a second extraction with ether.

In regard to the proportion of the alkaloid present in the fluid extract of gelsemium, we obtained, as the average of several experiments, about 3·20 grains of the purified base from eight fluid ounces of the extract examined. Since a fluid ounce of the extract weighs about 450 grains, it would thus appear that it contains about 1-1100th of its weight of the alkaloid, or about one grain in two and a half fluid ounces. Doubtless a notable quantity of the base was lost in the repeated purifications. That the extract as found in commerce is uniform in strength, we are not prepared to state.

*Physiological effects.*—That this alkaloid is a very active and powerful poison, is shown by the following experiments. One-tenth of a grain, in the form of chloride and dissolved in a small quantity of water, was administered to a strong healthy cat. Immediately it caused extreme frothing from the mouth, and in twenty minutes the animal exhibited great weakness of the extremities, walking with much uncertainty. In forty minutes there was extreme prostration with entire inability to walk and the uttering of plaintive cries. In one hour the prostration was even more complete. When seen six hours after the poison had been administered, the animal appeared comparatively well, but walked with a very uncertain gait. There is little doubt but more or less of the poison was expelled from the mouth by the excessive frothing.

Three days afterwards one-eighth of a grain was administered to the same animal by hypodermic injection, the animal in the meantime having apparently entirely recovered from the former dose, and being well fed. In about fifteen minutes the animal exhibited great distress, manifested by sudden changes of position, moaning, etc. In forty minutes there was great prostration and great difficulty in moving, the legs giving way, and progression being about as often backwards as forwards; the pulse was 230, and very feeble; respiration greatly reduced and gasping; the pupils dilated to their fullest extent. These symptoms continued, and death took place in one hour and a half after the poison had been administered, without there being at any time convulsions.

*Chemical properties.*—In its pure state, gelseminine is a colorless, odorless solid, having an intensely persistent bitter taste. Thus far we have failed to obtain it in the form of well-defined crystals. It has strongly basic properties, completely neutralising the most powerful acids, forming salts, of which the sulphate, nitrate, chloride and acetate are freely soluble in water.*

In its free state, the alkaloid is only sparingly soluble in water, requiring several hundred times its weight for solution;

* We have not yet satisfactorily determined the ultimate composition of gelseminine, but hope soon to report its exact composition, together with that of gelseminic acid.

but it is very freely soluble both in chloroform and in ether; one part of the alkaloid immediately enters into solution when agitated with twenty-five parts of the latter liquid.

If a drop of *concentrated sulphuric acid* be added to a small quantity of gelseminine, or of any of its colorless salts, it causes it to assume a reddish-brown color, and dissolves it to a reddish-colored solution. If this solution be *moderately heated*, it acquires a beautiful purple color. This coloration manifests itself from 1-100th of a grain of the alkaloid. Bichromate of potash stirred in the sulphuric acid solution of the base, produces no marked change.

*Nitric acid* readily dissolves the alkaloid, under the production of a greenish color, to a greenish or greenish-yellow solution.

*Hydrochloric acid* dissolves it with a yellow coloration to a colorless or faintly yellow solution.

*Caustic potash* has little or no effect upon the dry powder.

At a temperature somewhat below 212° F., gelseminine fuses to a colorless viscid liquid, which on cooling solidifies to a transparent vitreous mass. At a higher temperature the alkaloid is dissipated, without residue, in the form of white fumes. If these vapors be received on a warmed piece of glass, they condense in the form of minute drops.

*Reactions of solutions of gelseminine.*—Solutions of the salts of gelseminine, when pure, are nearly or altogether colorless, and have the peculiar bitter taste of the alkaloid. This bitter taste is well marked in a single drop of a 1000th solution of the base.

1. *Potash*, as well as the other caustic alkalies, precipitates the alkaloid from tolerably strong solutions of its salts, in the form of a white amorphous deposit, which is insoluble in excess of the precipitant. One drop of a 100th solution of the base yields a rather copious flocculent precipitate. After some hours the precipitate acquires a reddish or brick-red color.

2. *Bichromate of potash* throws down from solutions of salts of the alkaloid, when not too dilute, a copious yellow amorphous precipitate, which is slowly soluble in acetic acid.

3. *Carbazotic acid* produces a yellow amorphous precipitate. 1-100th of a grain of the alkaloid, in one grain of fluid, yields a very copious, bright yellow deposit; 1-1000th grain yields a greenish-yellow deposit.

4. *Iodine* in a solution of *iodide of potassium* throws down from solutions of salts of the alkaloid a brown precipitate, which is only sparingly soluble in acetic acid. 1-100th of a grain yields a very copious precipitate; 1-1000th of a grain, a good chocolate-colored deposit; 1-10,000 of a grain, a very distinct deposit.

5. *Bromine* in *bromohydric acid* precipitates the alkaloid from solutions of its salts in the form of a yellowish amorphous deposit. 1-100th of a grain in one grain of water yields a copious flesh-colored precipitate, which becomes yellow. 1-1000th grain yields a very good yellow flocculent deposit; 1-5000 grain, a very distinct precipitate.

6. *Chloride of gold* produces a yellow amorphous precipitate, which dissolves with difficulty in acetic acid. 1-100th of a grain yields a very copious precipitate; 1-1000th grain yields a good flocculent deposit.

7. *Bichloride of platinum* occasions a light yellow precipitate, which still manifests itself in one grain of a 1-1000th solution.

8. *Sulphocyanide of potassium* produces, in tolerably strong solutions of the chloride of the alkaloid, a dirty-white precipitate, in which, after a time, brownish or chocolate-colored flakes usually appear.

9. *Ferricyanide of potassium* throws down from concentrated solutions of the chloride a dirty-greenish or bluish-green precipitate, the green color of which after a time becomes more marked.

10. *Corrosive sublimate* occasions a white precipitate, which is only sparingly soluble in large excess of hydrochloric acid. 1-100th of a grain yields a very copious precipitate; 1-500th grain, a quite distinct turbidity.

Concentrated solutions of the salts of the alkaloid also yield precipitates, of a dirty-white color, with iodide of potassium and with ferrocyanide of potassium.

From the above it will be observed that the reactions of gelseminine are by no means so characteristic nor delicate as those of gelseminic acid. In poisoning by the fluid extract of gelsemium it might therefore happen that the acid would be discovered, whilst there would be a failure to satisfactorily prove the presence of the base.

### III. Case of Poisoning by Fluid Extract Gelsemium.

*Symptoms.*—In regard to the case of poisoning by this substance, heretofore mentioned, the particulars, as we understand them, were briefly as follows. On the 30th of January last, three teaspoonfuls of the fluid extract were administered to a young healthy married woman several weeks advanced in pregnancy, who at the time complained of no serious illness. In two hours after taking the dose, the patient complained of pain in the stomach, nausea, and dimness of vision. These symptoms were soon succeeded with great restlessness, ineffectual efforts to vomit, and free prespiration over the body. At the expiration of about five hours the pulse was found feeble, irregular, and sometimes intermittent; there was great prostration, with irregular breathing and slow respiration. The skin was dry; extremities cold; the pupils expanded and insensible to light; the eyes fixed and inability to raise the eye-lids. The vital powers rapidly gave way, and, without convulsions, death occurred in about seven hours and a half after the poison had been taken.

It will be observed that in this case, only three teaspoonsful of the fluid extract were taken. Presuming it to have had about the same strength as the preparation we examined, the quantity of the alkaloid contained in this amount could not have much exceeded the sixth-part of a grain. This would seem to indicate the alkaloid to be one of the most potent poisons at present known.

*Post-Mortem Appearances.*—Eight days after death the body presented the following appearances, as described by Dr. J. H. Stephenson, who made the autopsy and to whom I am indebted for the account. Countenance natural as in sleep. No emaciation, and body in a perfect state of preservation. Cadaveric rigidity very slight. The back of the neck and between the shoulders, extending the full length of the spine, as also the depending parts of the thighs and arms to the elbows, presented a congested appearance. The membranes and substances of the brain and medulla oblongata were normal. The adipose tissue remarkably thick, and highly tinged throughout with bilious matter. Lungs slightly collapsed, natural in appearance, and

superficial veins congested. Heart normal in size, superficial veins injected, and the cavities greatly distended with dark grumous blood, inside of which was found a well-defined membrane, identical in appearance with that found in diphtheria and pseudo-membranous croup. The abdomen presented no tympanitic distention. Stomach slightly distended with gas, and contained a small quantity of ingesta. Peritoneum and intestines in a healthy condition. Liver and investing membrane normal; left kidney congested. The uterus was slightly enlarged and contained a fœtus of about five weeks' development.

A small quantity of the contents of the stomach having escaped from the organ at the time of the dissection, was collected separately in a small bottle; the stomach with the balance of its contents was placed in a larger bottle. These bottles, with their contents, were carefully sealed and remained undisturbed until the 17th of May. At this time the contents of the bottle containing the stomach were found to have undergone considerable decomposition. A little pure alcohol was added to the decomposing mass, and it then allowed to remain until the 13th of June, when the chemical examination of the contents of both bottles was commenced.

*Chemical Analysis.*—The contents of the *small bottle*, consisting of about two fluid drachms of liquid with a small amount of solid matter, were digested with about one ounce of strong alcohol, the liquid then decanted, and the solids washed with fresh alcohol, which was collected with that first employed. The alcoholic liquid was now concentrated at a moderate temperature to about one-half its volume, then filtered, and the filtrate concentrated to about one drachm of fluid. This concentration caused the separation of some oily globules, and also of some apparently vegetable solid matter, and the mixture exhaled a very marked vegetable odor, very similar to that of the extract of gelsemium under similar conditions.

The concentrated liquid thus obtained was again treated with alcohol, filtered, and the concentrated filtrate treated with about half an ounce of pure water, which left considerable matter undissolved, and furnished, when filtered, a clear slightly yellowish solution. This aqueous solution was concentrated to a small

volume, filtered, the filtrate acidulated with a few drops of acetic acid and then extracted with two volumes of pure commercial ether. On allowing the ethereal liquid to evaporate spontaneously, it left a nearly colorless residue containing several groups of crystals, similar in appearance to those of gelseminic acid.

A portion of this residue, when examined in its solid state by nitric acid and ammonia, and another portion when dissolved by the aid of an alkali and the solution tested by several reagents, presented the chemical and fluorescent properties of gelseminic acid in a degree indicating the presence of a very notable quantity of the acid. The contents of the small bottle were not examined for the alkaloid.

The contents of the *stomach* were treated and purified after the general method described above, and the final aqueous solution acidulated with acetic acid and extracted with ether, for the purpose of recovering the organic acid, if present; the solution thus extracted was then rendered slightly alkaline and extracted by chloroform, for the purpose of recovering the alkaloid. The purified ether extract revealed very satisfactory evidence of the presence of the organic acid, both in regard to its fluorescent and chemical properties. So, also, the chloroform extract, when purified and the final aqueous solution concentrated to a very small volume and examined by several reagents, furnished undoubted evidence of the presence of the base, indicating it, however, to be present only in very minute quantity.

On comparing the intensities of the reactions of the several reagents applied with those obtained by the same reagents from solutions of the alkaloid of known strength, it was inferred that the quantity of the base recovered in this case did not much, if any, exceed the fiftieth-part of a grain. The quantity of the alkaloid originally taken, as we have already seen, did not probably much exceed the sixth of a grain.

The fact that the stomach with its contents had undergone considerable decomposition, and also that the chemical examination was not made until some months after death, would seem to indicate that the poison is not readily destroyed by decomposition, and that it may be recovered after comparatively long periods, even when taken only in small quantity.

COLUMBUS, OHIO, Nov. 15, 1869.

## A SUPPLEMENT TO CAMPBELL'S METHOD OF PERCOLATION FOR FLUID EXTRACTS.

By Samuel Campbell, of Philadelphia.

To the Editor:

In the September number of the American Journal of Pharmacy, I published an article entitled "a new and simple process for fluid extracts, by which any drug may be exhausted by percolation and without heat," and as I learn that there seems to be some misunderstanding regarding the minutiæ of the method proposed, I herewith take the liberty of presenting to you for publication a second paper, on the same subject, embracing an analysis of each step of the process, with a classification of a list of the fluid extracts made by this method in a series of experiments made by myself. The subject is an important one, and one that is worthy the attention of the revisers of the Pharmacopœia, recommending itself by its simplicity of manipulation and formula, involving no expense by waste, nor outlay of means for vessels, or stills, wherewith to recover alcohol, and requiring only ordinary care and skill to make a perfect fluid extract. It also leaves the retail pharmaceutist without excuse in not making the fluid extracts himself, in preference to buying them from the manufacturer, as, by this method, he may prepare as small a quantity as four fluid ounces, or as large a quantity as desired; as I experienced better success in making five pints than in making a half pint, the smaller quantity requiring more careful manipulation than the larger, a point which will recommend itself to the manufacturing pharmaceutist. The first step in the process is to obtain a powder of the proper degree of fineness, a point upon which there seems to be a difference of opinion among pharmaceutists; some maintaining that it is not necessary to have a fine or very fine powder for purposes of percolation; others taking the contrary view, that a powder cannot be too fine. In my opinion, much harm has been done by the advocates of extremely fine powders, as it has a tendency to throw the whole business of making officinal fluid extracts into the hands of the manufacturers, or compels the conscientious retailer, who prefers to make

his own preparations, to depend upon the wholesale dealer, or grinder of drugs, as to the purity of his powders, it being almost impossible for him to powder them in his own laboratory, as it involves so much time and labor as to make the products cost him more than he can buy them of the large manufacturer, and as a consequence he cannot compete with his rival or neighboring store. Take, for instance, nux vomica, or pareira brava, or gentian root, or buchu leaves, and what facilities are there in any retail drug store to reduce any one of these substances to a powder, in accordance with the officinal grade of fineness, without he is willing and able to spend two or three days over a drug mill, or pestle and mortar. Another objection to a fine or very fine powder, is a fact that I have always observed, in dampening the powder previous to packing in the percolator, which is the formation of small pellets all through the mass, caused by the agglutination of the dusty or finer particles of the powder the moment the moistening liquid reaches it; and it is almost impossible to avoid such a result, the only method being to use a large amount of liquid, so as to form a pasty mass, which then becomes impracticable for packing solidly, and, in all such cases, an imperfect percolation is the consequence. In my method I have adopted the grade of powder known as moderately coarse. Arriving at such a conclusion, after having made a novel yet interesting series of experiments, which I shall designate as the analysis of moderately coarse powders, I selected twenty different drugs, and after grinding twice, alternately through a Swift's drug mill, and sieving, and then contusing in a pestle and mortar until the whole had passed through a No. 40 sieve, I found that three-fourths of the whole quantity, in almost every instance, would pass through sieve No. 50, known as moderately fine, more than one-half through sieve No. 60, known as fine, and one-third, and in a majority of cases nearly one-half, through No. 80, known as very fine, leaving, on an aggregate, a balance of only one-fourth of the whole quantity of the grade No. 40. Hence, I deemed it an absurdity and a waste of time and labor for any further reduction in the fineness of the powders. And the practicability of the idea was evidenced by the success in the almost entire exhaustion of upwards of

60 different drugs, as the range of my field of experiment. Having procured a powder moderately coarse, the next step is to mix the proper menstruum in the proportion of sixteen fluid ounces for every sixteen troy ounces of the powder to be percolated, preparatory to the next step of the process, which is to dampen the powder. I find that four fluid-ounces of the prepared menstruum is quite sufficient to dampen sixteen troy ounces of the powder, unless the drug is unusually bulky, and then six fluid ounces is enough. And in dampening the powder the liquid should be thoroughly incorporated by being well rubbed uniformly through the powder, so as to avoid any agglutination of the finer particles, or the formation of small pellets. It is a practical error to have the powder wet by using the whole of the menstruum, more especially in this method, as the object aimed at is to combine both maceration and percolation slowly during the four days of rest, and if the process is conducted in a glass funnel, it will be observed, at the end of four days, that the active soluble matter of the drug has percolated, or settled in the bottom of the funnel, leaving the upper layer, or at least one-third of the packed drug, tasteless; consequently it is more easily forced through by the displacing liquid. Having dampened the powder as above, the next step is to proceed to pack it, uniformly and moderately tight, in the percolator. Having previously placed a piece of sponge in the neck of the percolator or funnel, moistened with the menstruum, then cover over the surface of the drug a disc of paper and proceed to pour on the remaining twelve fluid ounces of menstruum, allowing it to be slowly absorbed or percolated through the packed drug. When the liquid is observed to begin to saturate the piece of sponge in the bottom of the funnel, place a cork tightly in the orifice of the neck of the funnel and allow the whole to macerate four four days. At the end of that time remove the cork, and pour over the surface of the drug in the funnel a displacing liquid corresponding to the menstruum used, omitting glycerin, as, for instance, if the menstruum was alcohol and glycerin, let the displacing liquid be strong alcohol; if alcohol, water and glycerin, use for displacing liquid dilute alcohol; if water and glycerin (as used for wild cherry bark) use cold water as the displacing

liquid. When sixteen fluid ounces have been obtained the process is finished, and in every experiment the result far exceeded in odor, taste and appearance the product resulting from the usual method. In a number of the experiments I observed that, after obtaining the first sixteen fluid ounces, and then continuing the percolation to the extent of two or four ounces more, the last percolate was charged with some odor and coloring matter, but upon careful evaporation proved to my mind that it was not worth preserving, nor in any one instance was there a greater loss than one per cent. of active matter, a fact which was practically proven by the experiment of drying the exhausted powder, then redampening and repacking it in the funnel, and again exhausting with alcohol and water, until the menstruum passed colorless, then carefully evaporating to an extract, and weighing; thus giving the accurate loss of soluble matter. As a matter of great accuracy it could be obviated by the suggestions thrown out by Mr. A. B. Taylor, in his criticism on my method before the Pharmaceutical Association, last September, which was to percolate eighteen fluid ounces, then reduce it to sixteen fluid ounces by spontaneous evaporation; this, of course, refers to the alcoholic fluid extracts. Yet I feel assured that, when the process is carefully conducted, and not hurried through, the first sixteen fluid ounces is almost, in fact quite, as near to perfection as it can possibly be made, and know that it will compare much more favorably in regard to the amount of active soluble matter than the present officinal method, as it has always been a source of inquiry to my mind whether the evaporated portion of the officinal formulas contain any remedial properties worth preserving. Also, whether in mixing it with the reserved portion, and filtering after standing, it does not carry with it a portion of the active matter. The use of glycerin as forming part of the menstruum in this method is not intended to conflict with the officinal formulas, but is suggested as an invaluable agent and addition for dissolving out the active matter of drugs, also for its superiority over sugar in preventing the deposition of a portion of the active soluble matter that occurs in almost all of the fluid extracts; and further, from some unfinished experiments, I am inclined to believe that,

in all cases where the active principles of drugs exist with extractive matter, glycerin will supercede all other menstruua. The only doubt existing with me in regard to such an assertion is the want of knowledge as to the capability of glycerin to withstand or arrest fermentation in the presence of vegetable matter, and hope to be able, at some future time, to give the result of such a series of experiments.

The following list comprises all the substances I have experimented with, and the menstruum used:

CLASS No. 1,

Or Alcoholic Fluid Extracts; menstruum composed of Alcohol, three-fourths; Glycerin, one-fourth.

Aconite Root.
Buchu Leaves.
Calamus.
Capsicum.
Cardamom.
Cascarilla.
Ceylon Cinnamon.
Cubebs.
Juniper Berries.
Lupulin.
Nutmegs.
Savin.
Sassafras Bark.
Valerian.
Ginger.

CLASS No. 2,

Or Hydro-Alcoholic Fluid Extracts; menstruum composed of Alcohol, one-half; Water, one-fourth; Glycerin, one-fourth.

Absinthium.
Aconite Leaves.
Camomile Flowers.
Belladonna Leaves.
Catnip.
Catechu.
Chimaphila.
Chirayta.
Cimicifuga.
Cinchona Calisaya.
Collinsonia.
Colombo.
Colchicum Root.
Colchicum Seed.
Conium Leaves.
Cypripedium.
Digitalis Leaves.
Dulcamara.
Ergot.
Erigeron Canadensis.
Eupatorium.
Galls.
Gelsemium.
Gentian Root.
Geranium.
Helleboris Niger.
Humulus.
Hydrastis Canadensis.
Hyoscyamus Leaves.
Ipecacuanha Root.
Iris Florentina.

Kino.
Krameria.
Lactucarium.
Lobelia Leaves.
Marrubium.
Pareira Brava.
Quassia.
Quercus Alba.
Rhubarb Root.
Rubus Villosus.
Sarsaparilla.
Senega.
Senna.
Serpentaria.
Spigelia.
Stillingia.
Taraxacum.
Uva Ursi.

CLASS No. 3,

Menstruum composed of equal parts of Glycerin and Water.

Wild Cherry Bark.
Liquorice Root.
Coffee (Java.)

The subject is one of interest to the profession at large, and I will hail with pleasure the criticisms of any or all whom it interests, involving, as it does, a complete revolution in th various pharmaceutical formulas of all our standard authorities.

*Nov.* 10*th*, 1869.

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## THE DRUG BUSINESS IN SWEDEN.

BY OSCAR OLDBERG.

The number of drug stores in Sweden is limited by virtue of the control that the Royal Board of Health exercises over them. Formerly the privilege of practicing the pharmaceutical profession and selling drugs was granted by the King alone, on the recommendation of the Board, to persons considered competent chemists and pharmaceutists. These licenses were transferable, and hence all *old* drug stores in Sweden can be bought by any one who has fulfilled all the requirements of law and established his competency. The licenses to hold and conduct these stores are generally worth three times the value of the stock and fixtures.

But the licenses of all *new* drug stores are of an entirely different character—being granted to the pharmaceutists only for their lifetime, with which they expire. New license is tendered to the next happy aspirant when a druggist holding such non-transferable license dies.

The number of pharmaceutical establishments in Sweden being extrmely small in comparison to what it is in this country, it follows that licenses are there very valuable, although by no means in the same proportion. A city of about 5000 inhabitants, with an additional 20,000 of people living all around it, may have only one drug store. In the United States I have heard of two such shops in a place with only a few hundred residents. To be sure, populations of such little embryos of future great cities in America grow at such a marvellous rate, that it is almost justifiable to put up one pharmacy for every 500 people, or two such for every one bank and newspaper.

But, as for Sweden, let us go through a regular apprenticeship there and rise by degrees—on paper—up to the eminence of a happy established boss.

Master A., 16 years of age, is rather a smart boy, and his father wishes to make something great out of him. But money is tight, and Master A.'s brother needs all that papa can spare for the completion of his studies at the University. What is to be done? Why, send the youth to a drug store,—of course. He has spent six years at the high school and is tolerably well posted in Latin, German and botany, etc., so he has all the requisites of qualification prescribed by law.

His father is either a country parson or something else. His mother having supplied him with a half dozen new shirts, a dozen pair of stockings, etc., etc., and his whole wardrobe having been inspected and reconstructed, Master A.'s trunk is packed, and, after an affectionate leave-taking from his home and folks, off he starts toward an unknown fate.

With all the money his father can possibly spare in his pocket-book, just a grain of uncertain fear in his heart, and a good pound of curiosity in his head, he at last reaches his place of destination. The store is one of the most prominent corners in the city; outside, over the door, a swan, a lion, an owl, an angel, a dragon, a deer, a unicorn, a crown or some other wonderful thing—the trade mark and name of the establishment. Inside, he finds himself puzzled out of his concepts altogether. The store-room is large; in the middle of it is a large counter, having a low railing along its outer edge, and

behind it stand two or three or four gentlemen, weighing and mixing and rubbing and pouring and writing with a remarkable speed. One makes pills and powders, another mixtures and liniments, and a third-one plasters and ointments, and so on. Behind the long counter on one side are two young men running about with scales in their hands waiting on a dozen customers. On the shelves around the walls is an astonishingly great number of bottles, and below the shelves long rows of drawers.

"Is the apothecary in, sir?"

"Yes sir. Anything particular?"

"Well, I am going to—to be an apprentice here."

"Oh yes! Walk into the back room."

Master A. goes behind the counter for the first time in his life, and marches on into another large room, which he thinks is another drug store. At last, after waiting an hour or two, he hears the approaching steps of the proprietor of all that.

"Ah, good day my boy. How is your father? Come along in here, I want to talk to you."

Oh, what an awful man he is though!!

The boy is engaged to stay four years in the store, during which time he receives for his services board, lodging and instruction. During the first year he cleanses bottles and mortars and all sorts of vessels and implements, waits on customers when he can get a chance to, and makes up his mind that he is the most unfortunate wretch in creation. The second year he feels a little easier, because, then Master B. comes in the store to take his place, through which notable event he is raised one step in advance, and has the sweet satisfaction to know that somebody is under him, any how. But still he is by no means enthusiastic about his learned profession. The third year he knows how to make a pill mass well, can spread a first rate plaster, make decoctions and infusions, and seldom washes any more mortars. The fourth year he is first apprentice, has a chance to put up a prescription or two a day, under the supervision of the prescription clerks, when they are busy or have something too troublesome. He goes into the laboratory back in the yard and helps the manufacturing chemists—aye, he is toward the end of his term

of apprenticeship trusted even so far as to be allowed to cook adhesive plaster on his own hook. He has now leisure hours which he can devote to study, and he knows more about the customers, the store, the magazines, the laboratory, the garrets and the cellars than any one else connected with the place.

Finally his employer finds it impossible to keep him any longer as an apprentice, without being looked upon as a tyrant; he apprehends that Mr. A. won't wait much longer before his patience is used up, and at last he consents to let him graduate. Doctor C. and D. and E. and F. are requested to come and examine the young student and to dine with his employer. At the examination one of the clerks officiates as Secretary, and writes down every question that is put to the poor fellow, together with the answers given by him. Master A. exhibits a row of bottles containing samples of chemical and pharmaceutical preparations made by himself, and as he goes through the mill they sift him quite severely sometimes. If he can satisfy his examiners, they sign the "protocollum," and it is sent, together with a certificate from the employers, to the Royal Board of Health.

After due consideration *of* and deliberation *on* the subject, that body issues his diploma and requests the young graduate to take the oath of allegiance and office. This done, he is a "pharmaciæ studiosus," and can put up a prescription or distil spirits of nitre on his own responsibility. He receives salary now, and is a professional man.

One of the manufacturing chemists is going to take his place at the prescription counter instead of Mr. L., who had the good luck to be appointed druggist at Y., the other day, and young Mr. A. fills the vacancy in the laboratory for a couple of years. Then, if he can raise the money, he goes to Stockholm and gets his name entered on the list of candidates for admission to the College of Pharmacy. He is subjected to another examination and, if he successfully passes it, admitted. At the college he reads this book and that book and the other book, too, and makes all sorts of complicated preparations and chemical experiments, and after two or three years he is ready for his "tentamina" in the different subjects. These tentamina are, thank God, his last

examinations, and, after having passed, he gets another diploma from the Royal Board of Health, takes another oath of office and is called an apothecary.

But where is he going to get a drug store from? He has no money, and it would not help him much if he had a rich uncle to supply him with that most useful article either, for he must, according to law, serve four years more first. Well, well, he serves. He is now 29 or 30 years of age, and has not been able to save much from his rather small salary, but he wants a drug store to be sure.

His uncle could buy him one now—one of those old establishments with transferable licenses; but ten chances to one he hasn't got a rich uncle.

By and by the proprietor of one of the newer drug stores dies, and the place is advertised vacant. There is at last one-tenth or twentieth part of a chance. He sends in his application with all the others, and in due time is notified, through the Journal of Pharmacy, that Mr. R., who is 50 years of age, and has been standing behind the prescription counter till he has ruptures of blood vessels in both legs, got the nomination from the Board of Health, and was confirmed by the King. Or if he is unusually fortunate and particularly skilled in his profession, and his competitors are less so, he gets the appointment and borrows money to buy the stock and fixtures with from the widow of his predecessor. Once well established, he devotes the balance of his lifetime to first pay his debts, and then, if there is any time left, make money.

We have in Sweden a good many excellent pharmaceutists dying from old age before they have the satisfaction to see a store of their own. Some emigrate to America, Africa and Asia, before it is too late.

The Royal Board of Health is the bugbear for the druggists. They instituted a regular annual visitation in each store by the provincial physicians, and besides, made a surprise call occasionally. At these visitations the store was searched through, and sundry chemicals and preparations tested, the visiting physician or professor looked after, that the druggist did not charge more for his drugs or prescriptions than the annual price

list issued by the Board allowed, and the poisons were particularly taken notice of.

In Sweden all poisons are kept in one closet, separated from all other medicines, and they are locked up. No one except the graduated pharmaceutist has access to the poison closet.

The poisons are divided into six classes:

1st. Preparations of opium and lactucarium.
2d. " " antimony and emetia.
3d. " " mercury and lead.
4th. " " nux vomica, elaterium, veratria, euphorbium and croton oil.
5th. " " arsenic and phosphorus.
6th. " " prussic acid, chloroform, belladonna, hyoscyamus, digitalis, stramonium, conium, aconite and ergot, etc.

The closet was divided off into six compartments, each one painted with its own distinct color. In these compartments the different classes of poisons were put.

| | | |
|---|---|---|
| 1st. | Class, | blue. |
| 2d. | " | red. |
| 3d. | " | yellow. |
| 4th. | " | green. |
| 5th. | " | black. |
| 6th. | " | white. |

The labels on the poison phials had the same color as the shelf to which they belonged, and the bottles of all classes had a characteristic mark (☿) common to all. The labels on arsenic and phosphorus being black, they had white lettering.

This arrangement prevented every possibility of mistake, for if one of these bottles, with a colored label and the poison mark on it, should stand among a hundred others, it would still be immediately recognized and never touched. And the classification effectually guards against mistakes between the different poisons themselves.

No poison was ever sold except on prescription from a regular physician, and arsenic only when the buyer signed an acknowledgement of the receipt of it on the back of that prescription. The entire stock of arsenic on hand at the annual visitation by

the physician of the district was carefully weighed, and then the phials containing it sealed up. At the next visitation it was weighed again, and the druggist requested to show the original prescriptions for the arsenic missing. When no arsenic had been sold, the seals were of course not disturbed. A journal was also kept, in which account was kept of all arsenic bought and sold.

All prescriptions for the least quantity of any remedial agent, which belonged to the poison closet, were kept by the druggist and never renewed, except on special order from the physician. For instance, a mixture containing one grain of extract of hyoscyamus to four ounces of some innocent cough syrup could not, according to law, be renewed. All other prescriptions for non-poisonous preparations were invariably returned to the customers. When furnishing a prescription, the preparer of it was obliged to mark down on it the price of each separate article entering into its composition, and then the cost of labor, bottle and capping and label beside; this long column of numbers was then summed up, and the figurer put his name under the sum, and was thus responsible for its correctness, as well as for the preparation itself. Here are samples of the valuation of prescriptions:

| | | | | | |
|---|---|---|---|---|---|
| ℞ | 4 | Extr. hyoscyami, gr. vj. | 1 | ℞ | Sulph. zinci, gr. x. |
| | 6 | Aquæ fœniculi, ℥ij. | 2 | | Aquæ destillat. ℥viij. |
| | 4 | sol. Solve. adde. | 4 | | sol. |
| | 8 | Syrup. althææ. | 4 | | capp. m. f. sol. |
| | 24 | Decoct. senegæ, *aa*. ℥i. | 12 | | phial. |
| | 4 | capping, cork and label. | — | | |
| | 9 | phial. | 23 | | ore. X. Y. Z. |
| | — | | | | |
| | 59 | ore. X. Y. Z. | | | |

| | | |
|---|---|---|
| ℞ | 1 | Pulv. nitrat. kalic. gr. v. |
| | 1 | " rad. ipecac. gr. j. |
| | 8 | " opii depurat. gr. ss. |
| | 7 | mixing. |
| | 6 | powd. papers, m. f. pulv. dr. tal. doses, No. vj. |
| | — | |
| | 18 | ore. X. Y. Z. |

One American cent is about equal to three Swedish ores.

All this certainly secures unparalleled safety and an excellent corps of apothecaries, but the total absence of all competition is damaging to the practical science itself. Why, there is hardly any progress at all in pharmacy, and however book-learned, however keen chemists the druggists of old Sweden are—they are slow in many respects. I see, for instance, in the new edition of their Pharmacopœia, and hear from my cousin, who has lately been engaged in one of the largest drug stores there, that they know nothing as yet about percolation, fluid extracts, the modern resinoids, our elegant American elixirs and glyceroles, granules and sugar-coated pills.

On the other hand, they have now adopted the French gramme weight; they know by heart the equivalent of an element to a fraction, and can make pills as round as the very best shot in double quick time.

It is unreasonable to expect more as long as there is no competition. Why not allow every druggist who has "served his time" and got his diploma to put up his shingle and make nauseous pills? I am confident that the disagreeableness of their pills would vanish soon enough, and by and by they would even have them sugar-coated. This will never be accomplished under the present system. In my humble opinion, the system in Sweden and the United States are the extremes. Grant no licenses to unqualified persons, but do grant them to all who have thoroughly studied their profession, and I think we will be better off in every respect.

*Washington, D. C., Nov.*, 1869.

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## ON MR. CAMPBELL'S PROCESS FOR PREPARING FLUID EXTRACTS.

By James T. King.

The changes in the process of preparing fluid extracts, suggested by Mr. Samuel Campbell in the Sept. No. of the Journal, appeared well worth a trial, as the objects aimed to be reached are important, viz., avoiding the use of heat, and saving alcohol. But it appeared to me that the process was not applicable to all drugs, or rather, that some of the drugs specified in the

hydro-alcoholic class would not yield all their active principle, in sixteen fluid ounces of percolate from sixteen troy ounces of the drug.

Rhubarb was taken for the experiment. The root was powdered in a Swift's drug-mill and passed through a sieve of forty meshes to the linear inch, until sixteen troy ounces were obtained; this was moistened with a menstruum composed of two parts alcohol, one part water and one part glycerin, three fluid ounces being sufficient. It was then carefully packed in a funnel prepared for percolation, the surface covered with a piece of filtering paper, and thirteen fluid ounces of the menstruum above described poured over it.

Twenty-four hours showed that the sixteen ounces of liquid used was not sufficient to descend through the powder.

Finding that the menstruum was all absorbed and its descent stopped, sufficient dilute alcohol was added, after the expiration of thirty-six hours, to uniformly moisten the drug. Six ounces more were required—the sixteen troy ounces of rhubarb requiring twenty-two ounces of liquid.

After macerating for the length of time specified by Mr. C., dilute alcohol was added until sixteen ounces of percolate were obtained. This was a dark strong extract of rhubarb, but the drug was not exhausted, eight ounces more being required.

The result of the experiment agrees nearly with those of Mr. Reynolds, reported in the Nov. No. of the Journal.

The suggestion to allow maceration for several days before percolating is a good one, as less menstruum will be required for the complete exhaustion of the drug.

*Middletown, N. Y., Dec.*, 1869.

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## PHARMACEUTICAL NOTES.

By Wm. Silver Thompson.

### *Vallet's Protocarbonate of Iron.*

In the U. S. Pharmacopœia of 1860 this preparation is called "Pills of Carbonate of Iron." This was probably an oversight on the part of the framers of that work, as it does not direct the mass to be made into pills.

After considerable experience in making this preparation, the firm of which the writer is a member has found it advisable to depart in some respects from the officinal formula, and by doing so have produced a more stable preparation, which is but slightly hygroscopic, and is always ready to be formed into pills of firm consistence. Our formula is as follows:

Take of Protosulphate of Iron, 8 ounces;
Bicarbonate of Soda, 6 ounces;
Sugar, in fine powder, 4½ ounces;
Clarified Honey, ½ ounce;
Syrup, a sufficient quantity;
Water, a sufficient quantity.

Dissolve each salt separately in a sufficient quantity of water, and add the soda solution to the iron solution gradually, constantly stirring until the effervescence ceases, when add about a fluid-ounce of syrup, and again stir. After the carbonate of iron has subsided, draw off the supernatant liquid and repeat the washing with cold water slightly sweetened with syrup, until the washings are free from saline taste, when, having again drawn off the supernatant liquid, transfer the precipitate to a muslin cloth, and express as much of the water as possible.

To the precipitate, in a porcelain dish placed over a water-bath, add the honey and sugar, and with frequent stirring evaporate to the pilular consistence.

Prepared as above the mass is of fine consistence, of light color, and contains a large proportion of carbonic acid, which may be shown upon the addition of a few drops of diluted sulphuric acid to a small portion.

*Syrup of Bromide of Iron.*

The following formula, with careful manipulation, will furnish a satisfactory preparation:

Take of Bromine, 9 drachms;
Card Teeth, 4½ drachms;
Sugar, 10 troy ounces;
Water, a sufficient quantity.

To the bromine add five fluidounces of water in a flask of the

capacity of at least a pint, add the card teeth in small portions at a time as the action progresses, having previously placed the flask in a sand bath.

Insert into the mouth of the flask a tuft of card teeth moistened with water, to arrest and prevent the escape of a portion of the bromine should the action become violent.

When the action has ceased, heat the solution of bromide of iron containing the remaining or undissolved portion of the card teeth to the boiling point, and filter through paper into a bottle containing the sugar, marked to the measure of a pint.

Wash the undissolved card teeth with a small portion of water, and add the washing to the contents of the bottle through the filter, followed with sufficient water to make a pint of syrup. This syrup contains nearly a drachm of the salt to each fluid-ounce.

*Syrup of Hypophosphite of Iron.*

Take of Hypophosphite of Lime, 256 grains;
Protosulphate of Iron, 493 grains;
Sugar, 10 troy-ounces;
Hypophosphorous Acid, a sufficient quantity;
Water, a sufficient quantity.

Dissolve the hypophosphite of lime in four fluid-ounces of boiling water, and acidulate the solution with hypophosphorous acid.

Dissolve the protosulphate of iron in four fluid-ounces of boiling water, mix it with the lime solution, and set the mixture aside for two or three hours. When the reaction has ceased and the sulphate of lime formed has subsided, decant the clear iron solution and pour it into a bottle containing the sugar, marked to the measure of a pint, and add water sufficient to make a pint of syrup. When the sugar is dissolved, after occasional agitation transfer the syrup to small vials and cork tightly.

Each fluid-ounce of this syrup contains sixteen grains of ferrous hypophosphite.

*Baltimore, Md., November*, 1869.

## LIQUOR OPII COMPOSITUS. (COMPOUND SOLUTION OF OPIUM).

By Edward R. Squibb, M.D.

In the early part of 1859 the writer of this note completed a design previously formed and less definitely executed, of offering for general medical use a liquid preparation containing only the useful anodyne and hypnotic constituents of opium, and of uniform strength.

The design originated in a desire to improve upon the advantages of the "opium titré" or assayed opium of French pharmacy, and to imitate, with improvement, if might be, some of the advantages claimed for the nostrums known as Battley's "liquor opii sedativus," and McMunn's "elixir of opium."

Such a preparation was made, and, under the name of liquor opii compositus, was placed in the hands of several physicians who were supposed to be intelligent close observers, and who had been long familiar with the various preparations of opium and their effects in use. These trials, though not very numerous, resulted in the main so favorably that, after continuing them through the year 1859, a paper was prepared upon "opium as a therapeutic agent," containing a minutely detailed practical working formula for the preparation of liquor opii compositus, and strongly recommending it for trial in general use, and for introduction into the then approaching revision of the U. S. Pharmacopœia, if it should sustain its promised useful character. This paper was published in this Journal for March, 1860, and may be found in Vol. VIII of the third series (Vol. 32, whole number), at pages 115 and 120 et seq. The preparation was not advertised nor pushed in any way, either publicly or privately, but was simply announced for sale on the writer's price lists, with a recommendation for trial, and was allowed to make its own reputation, and seek its own level of value. In 1862 it had been much more extensively tried, but was refused admission to the Pharmacopœia by the Committee of Revision,—the Committee adopting instead of it the present formula for tinctura opii deodorata. With this latter preparation it was at once put in fair open competition, the two preparations being offered side

by side, with a fair statement that one had been rejected and the other adopted by officinal authority, and with the no inconsiderable inducement of 20 per cent. difference in price in favor of the officinal preparation. Beside, the officinal tinctura opii deodorata was always made from assayed opium, and was uniform in strength with the liquor opii compositus, with which it was placed in competition. The Pharmacopœia does not require the tinctura opii deodorata to be made by assay, but this was done to secure the competition against any disadvantage through want of uniformity in strength. The liquor opii compositus is always made of the strength indicated in the officinal tinctura opii, or laudanum, if the laudanum be made of good powdered opium as it should be. Such laudanum always contains at least four grains of morphia, which is equivalent to about five grains of crystallized sulphate of morphia in each fluidounce. Since 1867 they have been placed side by side upon all the price lists issued by the writer, and until recently with notes fairly setting forth the characteristic points of each. Diligent inquiries have been made in regard to the comparative value of the preparations, and whenever these inquiries have been answered the preference has been given to the compound solution. The sale of both has increased steadily year after year, but the sale of the compound solution has increased much more rapidly than that of the deodorized tincture, and is now more than ten times greater. The regular and steady increase in the demand for the compound solution during the past eleven years having now increased its production in the writer's hands to over eight hundred pounds a year; and the probability that many pharmacists make it for themselves, induces him to undertake a revision of the formula, in order to remove some objections to the present formula, which appear to have been established on good grounds.

The first and principal objection to the present formula is that the odor and taste of ether is disagreeable to most persons, and to many nauseating and hurtful. The increasing use of ether as an anæsthetic, and the nausea, vomiting, and natural disgust produced by it when so used, and the frequent necessity for an anodyne after anæsthesia, renders it of some importance that the anodyne should not contain the agent which has excited the

nausea and disgust, but should rather contain some corrective or corrigent to this tendency to nausea. The compound spirit of ether was used in the preparation chiefly as a preservative agent, to prevent change in the solution, but also to have whatever effect it might, in so small a proportion (3 minims in 24), in favorably modifying the action of the opiate. Dr. Physick and many other excellent authorities had the habit of associating the true Hoffman's anodyne (made with heavy oil of wine) with their opiates, and the habit was confirmed by their observation of the effects obtained. It, however, could not be introduced into the compound solution of opium in sufficient quantity to be very effective, even as an adjuvant, and it is therefore highly probable that its chief agency has been that of a preservative against change in the preparation, and therefore that it might be replaced by some other preserving agent, even if objectionable only in a small proportion of the cases in which it is used, without altering the intrinsic character or value of the preparation.

The second objection to the compound solution of opium was that when long kept in a bottle only partially full, particularly when thus kept in warm climates, or in a warm place in a dispenser's store, it would gradually lose the odor of ether, and assume that of acetic ether. This change was rarely completed in less than two or three years, but numerous instances have been met with where every trace of both ether and heavy oil of wine odor had disappeared. Such specimens, when carefully tried, were found to possess their full original anodyne and hypnotic value, and gave to some good observers the impression or conviction that the acetic ether thus spontaneously generated was an improvement upon that which it replaced. Through watching this suggestion during the past two years, and reading somewhat upon the uses of acetic ether in continental Europe, where it is occasionally prescribed, the conclusion has been reached that even in small quantities it has a pleasant stimulant effect, and that its odor and taste are refreshing and agreeable to a large majority of people, or indeed to almost all. And finally, that if medicinal at all, it is so to nervous susceptible persons, and always in the direction of favorably modifying the well known disagreeable effects of opiates.

These are the two objections that are to be met, and, if possible, removed, in the revision of the formula for compound solution of opium. The much more forcible objection of a complicated formula, and a multiplicity of detail involving sufficient knowledge and skill to make a correct opium assay, can only be met by the arbitrary opinion or judgment, that he who cannot make such a preparation when all the details are laid down step by step before him, is unfit to be trusted with the dispensing of medicines. It has been made, and skilfully made, by persons of only ordinary pharmaceutical acquirements; and many have refused to make it from the insufficient reason that it involved too much pains and labor. As the essential points or supposed advantages of the preparation,—namely, its uniformity of strength independent of the character or quality of the opium from which it is made, and its freedom from many, if not all of the useless and hurtful constituents of crude opium, whilst retaining the useful constituents in their natural combinations,—as these points are considered essential, are the only objects of the process, and can be attained in no better or more simple way known to the writer, this objection must stand with its full and acknowledged weight against the preparation, with the simple remark that in pharmacy, as in other arts, the best results are not often attainable without commensurate skill and labor.

So much for the revision of the formula, in regard to the objections that have been justly raised against it. The next question that arises is, can it be therapeutically improved? And to this, within the knowledge and judgment of the writer, and of those observant physicians with whom he is in frequent intercourse for counsel and advice, it must be answered that it probably cannot be materially improved in this respect. All opiates, no matter how made or how used, will disagree with many persons, and with some more than others; whilst that opiate which is best borne by some sensitive persons may be badly borne by others. All opiates will constipate almost all persons under all ordinary circumstances, and will produce a nervous reaction proportionate to the initial action, or at least in proportion to the initial overaction or overdosing. Then as all derivatives of opium must in the nature of things partake of the character of opium somewhat

in the relation of cause and effect, it seems most rational to accept together some of those advantages and disadvantages which long observation has shown to be as inseparable as cause and effect, and to seek, rather, by combination with other known agents, or by the subsequent use of corrigents, to remedy the disadvantages in those cases where these are of sufficient importance to demand medication. It is nevertheless now pretty well established, not only that some opiates disagree less than others with sensitive persons, but that some opiates are more generally acceptable and beneficial, and less disturbing than others, and this for reasons of two kinds: First, by excluding some of the disturbing agencies of the opium, and second, by more or less skilful combinations with corrigents. All that can be safely said of the past career of this liquor opii compositus is that it disagrees with a smaller number of sensitive persons, both in its primary and secondary effects, than most other preparations of opium, and that it is more pleasant in its effects than other preparations of opium, or the salts of morphia, in a very considerable proportion of cases, if not generally.

In the deliberate thought and attention given to this preparation during the past few years in connection with its increasing usefulness, it has sometimes seemed doubtful whether the simple depurated watery solution of opium adjusted by assay, and mixed with one-fifth or one-sixth of its weight of alcohol to preserve it from change, would not be the best practical form in which to offer it for therapeutic application. Such a preparation would be called simply liquor opii, and may be made by the formula to be given. This would leave all attempts to modify, correct, or remedy the unpleasant effects of the opiate to the extemporary judgment of the physician, where perhaps they more appropriately belong, because they would be better adapted to individual cases, and would yield a preparation that might be used by hypodermic injection.

This course would be now adopted in the revision of the formula, were it not that the disagreeable taste and smell, and the nauseating effects of opiates, are so objectionable to a large proportion of patients, and that physicians in general are not skilful in the use of corrigents, and therefore not unfrequently fall, or

are led into practices which, to say the least, do not always tend to improve the therapeutic action of their remedies,—the use of sugar-coated pills, for example. It is therefore mainly to cover the taste and odor of the opiate, to render it more acceptable in delicate conditions of the stomach, and to give it a direction or tendency opposite to that of nausea, that a small proportion of acetic ether and purified chloroform are now introduced into it instead of the compound spirit of ether. If these new ingredients have any important medicinal effect, it will surely be in a direction opposite to the natural nauseating and depressing effects of the opiate, and therefore they are safe, with a reasonable chance of being useful.

Such good effects may well be expected from chloroform, and might be secured if the chloroform could be well introduced in larger proportion, for the following principal reasons, which have led the writer to use it in the formula. Soon after the internal use of chloroform was practised it was found to be sedative and hypnotic, or to have very much the same therapeutic effects now attributed to chloral, and was by some physicians associated with opiates, and particularly with the salts of morphia, with very good results in favorably modifying the action, and controlling the after effects, as nausea, anorexia, headache, depression, etc. It was, however, practically very difficult to get the two substances in solution together within the limits of an ordinary dose without inconvenience from the pungency of the chloroform, and the best results were obtained from the clumsy and inconvenient plan of mixing them with thick syrup or honey. The burning effect of the chloroform upon the mouth, fauces and stomach, though of short duration, was objectionable, and thus the association of the two substances, though proved to be eminently advantageous, never came into general use. It was, however, sufficiently used and appreciated to attract the attention of quackery, and the nostrum called "chlorodyne" was the result. It is often wonderful to see how squeamish and critical physicians and patients are to the disadvantages and inconveniences of legitimate extemporaneous mixtures, which, when served to them in the plausible tone of quackery, lose all their disadvantages, and come out afresh with sensational novelty. Chloroform

associated with morphia salts forms the therapeutic basis of the nostrum "chlorodyne," and the extraordinarily incongruous and irrational mixture of molasses, peppermint, capsicum, cannabis, hydrocyanic acid, perchloric acid, and all the others, if there be more, forms a mere vehicle and blind for the attempted secretion of this old and valuable combination. When, however, it came out in this new dress, at the call of the tin trumpet of quackery, many physicians in the very cities where the extemporaneous use of the combination originated became loud in its praise, and their patients found no difficuly in swallowing it at double price. Through the now waning use of this "chlorodyne" and its numerous imitations, many physicians, and some of them without being yet aware of it, have been again taught, on a larger scale, that there is a value in the association of chloroform with their opiates for internal use. But to realize the best effects of this combination the chloroform must be in the proportion of about one fluidrachm to the grain of morphia salt, or about eight or ten minims to the ordinary dose. This makes a mixture which, though not too pungent for many uses, is so rarely needed as to be objectionable for common use.

These considerations led the writer to adopt purified chloroform as an ingredient in the new formula for liquor opii compositus, and a series of experiments was undertaken to determine how much chloroform could be introduced, and still have the solubility or miscibility of the preparation in water secured. This proportion was found to be unexpectedly small, even when the solution was made to consist of one-half its volume of alcohol, thereby taking the character of a tincture rather than a solution. One minim in twenty-five, or one-twenty-fifth of its volume, was found to be the maximum quantity of chloroform which would be permanently held in solution when the twenty-five minims of the preparation was dissolved in one fluidrachm of water or more. This solution when made with a fluidrachm of water was considered a little too near to the boundary line of precipitation of the chloroform, and a little too pungent or biting for common use, and therefore the proportion of chloroform was reduced to one minim in thirty minims of the finished preparation, and the whole formula as finally determined upon was as follows:

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| Depurated, assayed solution of opium, (Equal to one-third of a grain of sulphate of morphia.) | 14 minims, |
| Stronger alcohol, | 13 minims. |
| Purified chloroform, | 1 minim. |
| Acetic ether, s. g. 0·880, | 2 minims. |
| Maximum dose, | 30 minims. |

In the very full dose of 25 minims there will be,—

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| Of the opium solution (equal to about one-quarter of a grain of sulphate of morphia), | 11·67 minims, |
| Stronger alcohol, | 10·83 " |
| Purified chloroform, | ·83 " |
| Acetic ether, | 1·67 " |
| | 25·00 " |

In the average adult dose of 20 minims there will be,—

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| Of opium solution (equal to about one-fifth of a grain of sulphate of morphia), | 9·33 minims, |
| Stronger alcohol, | 8·67 " |
| Purified chloroform, | ·67 " |
| Acetic ether, | 1·33 " |
| | 20·00 " |

This preparation, when dropped from a common one-ounce vial, gives about eight hundred and twelve drops to the fluidounce;* or about one and seven-tenths (1·7 drops) drops to the minim. Therefore thirty-four drops is about equal to twenty minims. Thirty drops is perhaps the more common usage as the ordinary adult dose, while twenty-five drops is often sufficient for adult females, or even adult males who are susceptible to opiates.

It is occasionally required in double, or even in three times the maximum dose as above given, and then will of course con-

* The first two fluidrachms dropped from full bottle, 190 drops.

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| The second two " | 176 " |
| The third two " | 201 " |
| The fourth two " | 246 " |

tain twice or three times the quantities, equal to two-thirds or one and one-third grains of sulphate of morphia. These doses are, however, under ordinary circumstances poisonous; and it is always best with this, as with all other opiates, to give them in judiciously timed divided doses until the object or indication is *nearly* accomplished, and then stop.

When opiates are given incautiously in large doses, they often seem to meet the indications to their use with a shock or concussion, overwhelming all the powers; and in proportion as this impression is profound and continued, and in proportion as it over-reaches the desired object, in the same proportion is the subsequent reaction, producing depression, anorexia, nausea, headache, constipation, etc. Now in medicine, as in mechanics, it would be irrational to expect to control a reaction independent of control of the initial action, and therefore opiates are not justly chargeable with the results of this not uncommon misuse. On the other hand, however, it is necessary to avoid the very small doses which serve only to stimulate and excite the sensorium; and therefore no direction for dosing can be given that will be more than usefully suggestive to common sense and good judgment, acting upon a clear conception of just what is required to be done, and how easy it is to overdo this.

The plea for assayed preparations in medicine and pharmacy, in order to attain some degree of accuracy and uniformity in therapeutic practice and results, is well illustrated in the instance of opium. It is well understood that hardly any two lumps in a case of ordinary opium yield the same proportion of the useful alkaloids, and that the different lumps have as great a variation as from five per cent. in some, to ten or eleven per cent. in others. It is also well known that by the escape of moisture the proportion of alkaloids is constantly varying until the opium is quite dry. It is also well known that opium is *not* the concrete juice obtained by incision from the unripe heads of Papaver somniferum, but is a varying proportion of this juice mixed with a heterogenous mass of foreign matter in a more or less solid condition, and that the productive or unproductive seasons, and the variations and speculations in price, have an influence in the yield of the alkaloids and also in the amount of foreign matters

admixed. If there be any who believe that the opium of the markets is wholly, or even in greater part, constituted of the juice of the capsule obtained by incision as described by the books, it is only necessary for them to divide the whole number of the population of the part of Asia Minor which produces opium, into the number of pounds which constitutes a crop, to prove that it is impossible for any such number of people to collect any such quantities in any such way. It is also known that there are different grades of quality in opium, which *may* be judged by the appearance; and different grades of quality which *cannot* be judged by the appearance, no matter how expert the judge may be. Crude opium, to be officinal, must contain "at least 7 per cent. of morphia." Then this crude opium in drying loses an average of 20 per cent. of moisture. Therefore dried or powdered opium made from crude opium which is just within the officinal minimum limit and no better, will contain 8·75 per cent. of morphia.

The writer has recently seen a small lot of opium that, when dried, yielded a powder containing nearly 15 per cent. of morphia, and knows from actual observation that by appearance, on very critical inspection, it could not be distinguished from another lot which, under the same management, yielded only 12 per cent.; and yet there was only a difference of about $1.50 or less per pound in the price.

Beside this, opium being a mixture made up for price and profit at the place of production, and being of limited production, but of almost unlimited demand, has of late years assumed the character of a manufacture rather than a natural product; and its practical standing in the markets to-day in regard to its dilutions and adulterations at the place of original production is not very different from that of woolen goods in regard to shoddy. Hence the better grades of opium, like the better grades of woolens, are produced in comparatively small quantities for the comparatively small demand at higher prices, and these grades, naturally enough, fall into the hands of the makers of morphia salts, where intrinsic value is closely studied in the interests of pecuniary gain.

Again, so localized and so limited is the production of the

valuable varieties of opium, and so wide-spread and insatiable the demand for opium,—four-fifths of it, at least, being probably consumed as an intoxicant,—that a "ring" of speculators could, and did form a "pool" last year, and so controlled the product and the markets as to run the price up to more than double, and during one period to about three times the ordinary cost, and to maintain such prices for nearly the entire crop, with such signal pecuniary success as to warrant the prediction of future similar speculations. Indeed, at this moment opium is again on the rise, with the possibility, if not the probability, that it is again "cornered" by a "ring." All this will probably have the very natural effect of stimulating the production; but the production will be stimulated in two ways: not only to cultivate more poppies and make more juice, but also to make more opium from the juice,—that is, debase it still farther in the manufacture, just as wool is made to go farther when the supply is short of the demand, and the price consequently high.

Now if these statements and deductions be true, and have any value in or any bearing upon medicine and pharmacy, they indicate one thing, and teach one lesson which is optional with us to learn or not, and that is, that the comparatively small portion of opium which is used in legitimate medicine and pharmacy should be used only by assay; and that such opium and its preparations should be, by assay, brought to a definite uniform medicinal strength. But from the variation in the various lumps of opium of the same case it is manifestly impossible, or at least impracticable, to assay it with useful accuracy in the crude moist condition. It must be either dried and powdered, and the powder be assayed, or it must be extracted, and the extract be assayed. Opium, then, is an exception to the rule which teaches all careful physicians and pharmacists never to buy drugs in powder. And yet, unless assayed, it is the most unsafe of all drugs to buy in powder. No plan is so good or so safe as to dry and powder the opium, and then assay the powder by extracting that; because, if carefully dried and powdered without too much heat, the quantity and quality of the useful alkaloids are not materially altered, whilst a large proportion of the useless and embarrassing extractive matter is rendered insoluble in the dry-

ing and powdering process. Beside, it is only by drying and powdering that a homegeneous product is obtained, every part of each package of which represents the whole. If a physician or pharmacist buys a pound of powdered opium, the assaying of 150 grains or so of this will indicate the quality of the whole. But if he buys a lump of crude opium and assays any part, or even two or three parts of it, the assay may not, and in all probability will not, represent the whole. He may make the whole lump into a strong tincture or solution by extracting it, and assay a portion of this solution or tincture, with the same ultimate result, but the assay is then less simple and more difficult.

This then is the chief, though not the only merit claimed for this liquor opii compositus, that it is made by assay, and therefore of practically uniform strength, entirely independent of the quality of the opium from which it is made.

This process of assay is not a highly critical scientific process which gives account of every tenth, or even every quarter of a per cent. of the useful alkaloids contained in the opium, but the aim is simply to come within one per cent., or thereabout, of the medicinal value and efficacy of different parcels of opium in its power to produce sedation, and to relieve pain in disease. Whilst a critical morphiometrical assay, or an analysis of opium, is one of the most difficult processes within the writer's knowledge, and probably has never been once attained in his thirty years' experience, a practically useful and sufficient process, by various methods, is so simple and easy as to be within the capacity of any person who is at all fit to be trusted with the handling of potent agents in their application to medicine. The first steps of that simple process of assay which is preferred by the writer are those by which the solution of opium which characterizes this liquor opii compositus is depurated, or freed from extraneous matters, whether these be hurtful or simply useless. And this is the second and only other important merit claimed for the preparation. By rejecting much of the resinous, gummy, nauseous, and otherwise hurtful constituents of the heterogeneous mixture called opium, a real practical advantage is obtained; whilst the retaining the useful alkaloids in their *natural combi-*

*nations*, associated with only that part of the coloring matter and extractive which, like the useful alkaloids, are soluble in both water and alcohol, and insoluble in ether, must be considered as important advantages. Hitherto the preparation has been an aqueous one, or at least contained only one-eighth of its volume of the mixture of alcohol, ether, and heavy oil of wine. But it is now so doubtful whether there is any real advantage in this, that the point is abandoned in order to secure the permanent solution of the chloroform by largely increasing the proportion of alcohol. Hereafter the preparation will contain about half its volume of stronger alcohol,—that is, will be of about the same alcoholic strength as the officinal tincture of opium. This materially disturbs and diminishes the appropriateness of the name, since "liquor" is commonly accepted to mean an aqueous solution, whilst "tincture" is as commonly accepted to mean an alcoholic solution. All good authorities, however, apply the word "tincture" in a technical sense to solutions where the solvent is only half alcohol, or even less. The name, however, cannot now be wisely changed, and the only circumstance which supports its equivocal appropriateness is that the large proportion of alcohol is not present as a solvent of the opium products, nor as a vehicle, since the water performs both these parts, but merely as a preservative agent, and as a solvent and protector for the chloroform and acetic ether; and it therefore may be construed to enter into the nomenclature with its more intimate associates under the word "compositus," as one of the compounding ingredients.

The preparation may perhaps not unfairly be criticised as unstable, from the great volatility of both the acetic ether and chloroform, since these will have a tendency constantly to escape from it during use. But when it is remembered that these are not essential to its primary medicinal efficacy, and that if entirely evaporated out the medicine would be but one-tenth stronger, the criticism will not have much force. A much more forcible objection to the preparation is often made in regard to its costliness. This objection cannot be satisfactorily met, and need not be attempted, since those who do not recognize the necessity or the value of the time, labor and skill involved in it, and are not

willing to pay a liberal profit upon these as invested in it, of course should not make or use it,—and will not, no matter what might be said in attempted justification of the cost. Upon an average it will represent about one-tenth of its weight of powdered opium; and it will not remunerate the maker unless it yields him about two and a half or three times the cost of that proportion of the best powdered opium.

It happens that the useful constituents of opium are all soluble in both water and alcohol, and are insoluble in ether; whilst a very large portion of the useless and hurtful constituents are insoluble either in water or in alcohol, or when soluble in both are also soluble in ether. Taking advantage of these circumstances the opium is subjected to the action of these solvents in succession, the successive residues being rejected, and the resulting extract is diluted to form the depurated solution. A small portion of this is assayed, and the result of the assay is applied, by multiplication to the whole, and this is then diluted to a definite degree by the addition of the other ingredients and water. Merely to state this general plan or outline of the process without the detail necessary to put it in practice would be of no use, and would really defeat the object of this paper, since that object is not more to convince the reader of the necessity for such a preparation, than to teach him a good practical way of making it for himself, and perhaps, also, to offer what may be a useful lesson in practical pharmacy. Beside,where broad and apparently exaggerated statements are made in any particular interest there is always room for suspicion of advertising; and the cause for suspicion is strengthened when any reserve can be detected, or when any link or point is missing in what should be clear inductive detail. It oftens happens to the writer, in reading what at first sight appears to be a plain open and sufficient detail of a process, to have his suspicion aroused by a missing link or an ambiguous sentence, and therefore the casual reader must excuse any prolixity in detail that may appear unnecessary in giving the following formula and process, since this prolixity, at least, is not caused by having something to conceal.

In giving the formula and process in the U. S. P. officinal weights and measures, nearly or practically accurate equivalents

of the metrical or decimal system of weights and measures are also given because they will be found very convenient to some operators, and because it will serve to familiarize those who read them with the values in this system which is coming into use.

Take of powdered opium, 1543 grains or 100 grammes.
Stronger ether,
Purified chloroform,
Acetic ether,
Stronger alcohol,
Water, of each a sufficient quantity.

Put the powdered opium in a suitable vessel of not less than 25 f℥. or 750 cc. (cc. cubic centimetre,—30 cc. to the f℥.) mix it thoroughly with 20 f℥. or 600 cc. of water, and allow the mixture to macerate over night. The water should be added to the powder in small portions with active stirring until a uniform smooth paste is made. The remainder is then added at once and the whole well stirred. A strong stirrer with a spatula-shaped, or spade-shaped end is almost indispensable to the convenient management of this process throughout. It is better to use this large proportion of water at the outset, because it enables the air to separate easily and well from the powder, and thus much improves the effect of the subsequent percolations;—because it forms a solution so dilute as not to be precipitated by subsequent admixture with the weaker percolates; and because it very much facilitates the final exhaustion of the residue. The powder continues to absorb tbe water, and the mixture to diminish in volume for several hours after the mixing.

Take two 9 inch or No. 22 round filters, fold them separately twice in the usual way for plain filters, and open them in the usual way, with one thickness of paper on one side and three thicknesses on the other. Then introduce one folded filter into the other in such a way that the three thickness side of each shall coincide with the one thickness side of the other. This double filter will then have four thicknesses of paper all round, and its effect in percolation is much improved by conducting off the liquid with uniformity in all directions. Place this double filter not too low down in a 5 inch or 12 centimetre funnel, and wet it well by filling the filter and funnel with water for a few

moments. Empty and drain the funnel and filter and place them on a proper funnel stand. Arrange a 16 f℥ or 480 cc. tared capsule or evaporating dish upon a water bath over a gas flame or other sufficient source of heat, and heat the water in the bath to boiling. Place the funnel stand so that the point of the funnel is over the capsule on the bath, and then having stirred up the opium mixture well, fill the filter from it, very nearly up to its edge, and continue to refill it occasionally until the whole of the mixture has been poured in. When the residue in the filter is drained, measure off 6 f℥. or 180 cc. of water, and rinse the vessel which contained the opium mixture two or three times with small portions of this water, dissolving off, or loosening whatever may have become adherent to the vessel by drying, by means of the stirrer, and pour the rinsings one after another into the top of the residue in the filter. Then keep the filter filled up with the remainder of the water until it has all been poured on, and again drain the residue. Then return the residue from the filter to the vessel in which the mixture was made, by the use of the spade-ended stirrer, leaving the filter as clean as possible, and unbroken in its position. To the residue add 1·67 f℥. or 50 cc. of water, stir it well into a smooth magma, and pour it back into the filter, draining and scraping as much of it out the vessel as practicable. Level it down in the filter, or rather so spread it out against the side of the filter as to leave the surface concave. Then measure off 5 f℥. or 150 cc. of water, and rinse the mixing vessel with small portions of this at a time until the vessel is clean, pouring the successive rinsings into the concave surface of the residue in the filter, and keep the filter filled up with the remainder of the water until it is all poured on. When the residue is drained, the filters and residue may be removed from the funnel, be flattened a little upon a folded newspaper, be put to dry, and when as thoroughly dried as the powdered opium was, may be weighed if desirable. In weighing, the outside filter is to be removed and placed in the weight scale to counterbalance the other one, or, if a nice weighing of the residue be desired, the inside filter must be weighed and the weight marked on it with lead pencil before it is used. The dry residue from good powdered opium weighs

about 736 grains or 47·7 grammes. If it be not desired to weigh the residue it is simply thrown away. If the water bath be well arranged, the evaporation of the percolate will be as rapid as its passage through the filter, even if a pretty thick porcelain dish be used. But if a tinned iron or tin capsule be used, the rate of evaporation will exceed that of the filtration, and the capsule will never get more than half full during the process. Stirring is not needed during the evaporation. The filtration and evaporation require from two to three hours. When the residue is drained and disposed of, set the hot capsule and contents on a scale, weigh them and subtract the tare of the capsule. It will commonly happen that the extract weighs less than the original weight of the powdered opium; if so, add water to it until it weighs the 1543 grains or 100 grammes. Then return the capsule to the water bath and warm the contents with stirring until the whole of the extract which has dried upon the capsule is entirely redissolved. Set the capsule on the scale and again add water to make up the loss by evaporation during this dissolving the extract. Return the capsule to the water bath again, and add to the contents 6 f℥. or 180 cc. of stronger alcohol, stir the mixture till it is uniform, and heat it to boiling. Clean the vessel used for the first mixture of the opium and water, and put into it 12 f℥. or 360 cc. of stronger alcohol, and while stirring this actively pour slowly into it the contents of the capsule. Rinse the capsule with 1 f℥. or 30 cc. of stronger alcohol, and add the rinsings to the main portion. Then cover the vessel to prevent unnecessary loss of alcohol by spontaneous evaporation, set it aside for 12 hours, or over night, and then pour off the clear alcoholic solution from the solid tarry residue. The first portion of alcohol added to the warm watery extract in the capsule is not sufficient to cause a precipitate, but is intended only to so dilute the extract as to render the after precipitation more perfect. The pouring of the contents of the capsule into the alcohol causes an immediate precipitation of a black tarry matter which collects upon the stirrer and vessel; but the solution does not become clear at once. That is, the precipitation is not complete for several hours. The first extraction of the opium by water rejects all the solid mat-

ters, all the resinous matter, much of the narcotin, and in short everything not soluble in water. But the gummy mucilaginous matter and nearly all the coloring matter is soluble in water, and forms a large and embarrassing portion of the watery extract. All the gummy matter and much of the coloring matter are insoluble in strong alcohol, and these constitute the black tarry matter precipitated when the watery extract is diluted and poured into the alcohol. This is the putrescible, fermentable portion of the extract, and its proportion varies greatly with the quality of the opium, being rarely less than 10 or 11 per cent. and rarely greater than 18 per cent. This tarry precipitate contains a small proportion of the useful alkaloids, entangled and carried down with it, and the larger the proportion of this tarry matter the more of the useful alkaloids it will contain. In one instance it was found to contain 0·6 per cent. of the weight of the original opium of morphia. If the precipitation be well managed, however, and particularly if time be valuable, the tarry matter does not contain enough alkaloids to repay the extraction until this residue saved from several operations shall have accumulated. But whether worked singly or accumulated they are dissolved in a little water by warming, the solution diluted with cold water until a filtered portion is no longer made turbid by farther dilution. The solution is then filtered off and the filtrate evaporated on a water bath to the consistence of a very thin extract. About ten times its volume of stronger alcohol is then added gradually, heated to boiling, set aside over night to again precipitate the now clean tarry matter, and then the alcoholic solution is poured off clear, and added to the larger portion of clear alcoholic solution poured off from the first precipitation.

The alcoholic solution is then put into a small tared still and, by means of a water bath, distilled until the alcohol is all over. By a good distillatory apparatus about four-fifths of the alcohol is thus recovered in a more dilute condition than when taken. This, by shaking with about one-eighth of its weight of powdered quick lime and redistilling, is again fit for the same use.

To the extract of opium in the tared still, after distilling off the alcohol, add sufficient water to make up the weight to 1543

grains or 100 grammes, or the original weight of the opium, and warm it in the water bath until the extract is completely dissolved. Then pour this solution into an eight ounce bottle, and rinse the still with a few drops of water, adding the rinsing to the contents of the bottle. When the bottle and contents are cold pour on to the diluted extract 3 fʒ. or 90 cc. of stronger ether, stop the bottle well, shake it vigorously, allow it to stand a few moments till the ether separates, and pour this off as closely as is possible with care. Pour on 3 fʒ. or 90 cc. more ether, again shake vigorously, and pour it off as closely as possible. Repeat this washing with ether a third time, when the accumulated washings will measure about 8 to 8·5 fʒ. or 240 to 255 cc. Put this into the still and distil it to dryness in a water bath with great care, remembering the inflammability of the ether vapor. In this way about 7 fʒ. of 210 cc. of the ether may be recovered in a condition to be used again for the same purpose. The residue from the ether washings varies very much in different parcels of opium, but may average about 1 per cent. of the weight of the opium. It is always a mixture of dark oily matter of a nauseous disagreeable odor, and a mass of solid matter which is amorphous or crystalline according to the rate of evaporation and the amount of heat used. By spontaneous evaporation large square tabular crystals are formed. Pour the diluted extract of opium, with the shallow stratum of ether which could not be poured off, from the bottle into the evaporating dish, and by means of the water bath evaporate it to about one half its volume. Put 10 fʒ. or 300 cc. of water into the cleansed vessel first used for mixing the opium and water, and pour into this the contents of the evaporating dish, rinsing the dish with a little water, and adding the rinsing to the larger portion. This dilution produces another insoluble precipitate, but one which is loose and flocculent and easily washed on a filter. At this point it is necessary to decide whether the solution is to be made up or finished by weight or by measure, though it may be done by both, the weight answering as a check upon the measure, and *vice versa*. As it is always given by measure, (drops or minims) and has its formula constructed upon minims or volume;—and as different parcels of opium yield the

depurated solution of different densities, it would seem only proper to make it up by measure. But the measures usually accessible are so much less accurate than the weights that they cannot be relied on. Beside, the broad surfaces of measures are not calculated to give that degree of practical accuracy required now a days in adjusting potent medicinal agents. Under these circumstances measures and weights applicable to the average grades of opium will both be given, even at the expense of complication. But the operator who may have a set of weights which agree tolerably among themselves is advised to use these in preference to measures.

Take a tared flask marked in the neck to hold 17 fʒ, or 510 cc., (a common French or German half litre flask which is marked low in the neck answers well,) filter the opium solution into it, and wash the filter and residue through with a little water. To this solution add 1574 grains or 102 grammes of stronger alcohol, and, having agitated the mixture, add water until the whole weighs 7870 grains or 510 grammes. This 1574 grains or 102 grammes of alcohol, measured at a temperature of about 17° C. = 62·6° F., measures 4 fʒ and 48 ♏, or 123 cc., but when this is mixed with the watery solution there is a contraction of volume in the mixture equal to about 162 ♏, or 10 cc, and an increase of temperature of 3 or 4° C. = 5·4 or 7·2° F. When the mixture is made up to the 7870 grains or 510 grammes it will measure more than the 17 fʒ, or 510 cc., on account of the rise of temperature. When, however, it is cooled to the original temperature at which the liquids were when mixed, the measure will commonly be but a small fraction over or under the measure, as the opium contains more or less extractive soluble in both water and alcohol. This 7870 grains or 510 grammes of solution now contains 20 per cent. of its weight and 30 per cent. of its volume of the stronger alcohol; and is about the density of water,—that is 1 cc. at 17° C. weighs about 1 gramme. It is perfectly clear, and will remain so indefinitely, as it contains alcohol enough to prevent any change even in the warmest weather. It is now ready for assay, and should be kept in a bottle to prevent loss by evaporation while waiting for the result of the assay.

The process of assay consists simply in precipitating the morphia from an aliquot part of this solution by means of ammonia,—drying and weighing the morphia, and applying the result, by multiplication, to the remainder of the solution, so as to ascertain the quantity of morphia which this contains. By this, of course, the farther dilution and adjustment are made. Although this process of assay does not pretend to be critically accurate, yet it will be so in proportion to the care and nicety with which the different steps are followed as now to be described; and whilst without any extraordinary degree of skill it may be so conducted as to indicate within three or four tenths of a per cent. of the morphia value of the opium used, it can hardly be so mismanaged as not to come within one per cent. of the true value.

Take one-seventeenth part, or 463 grains = 30 grammes, or about 1 f℥, =30 cc. of the solution, and put it into a small tared capsule, and set the capsule in a saucer or plate which contains a shallow stratum of, or is about half filled with, water. Then make a mixture of equal parts of officinal water of ammonia and stronger alcohol, and take of this mixture about 77 grains or 5 grammes, or 5 cc., rather more than less,—and add it to the contents of the capsule. Stir the mixture and then cover the capsule with a large beaker or other glass vessel, inverted so that the edge of the beaker or vessel rests on the saucer or plate in the water, and allow the whole to stand at rest during two days or thereabouts. If there be no alcohol added to the water of ammonia, it will sometimes precipitate a portion of the morphia at once, and with it an undue proportion of coloring matter. When diluted with alcohol and in a somewhat alcoholic solution the morphia goes down gradually and slowly in the form of a crystalline crust of a chestnut-brown color, which adheres to the bottom and sides of the capsule. The precipitation is generally complete in 24 hours, often in 12 hours, but is occasionally retarded by unknown causes. It rarely increases after 48 hours, however, and this period is fixed in order to render the result pretty secure. The quantity of ammonia used may vary considerably without materially affecting the result. The quantity indicated is quite enough for opium of the best quality, but

it may be increased one-fourth, or even one-half without much disadvantage. The morphia thus precipitated is not pure, but contains coloring matter enough to give it a light brown, or a chestnut-brown color. The quantity of coloring matter present is, in weight, surprisingly small, and is fully counterbalanced by the small proportion of morphia which refuses to crystallize out. The results are therefore pretty accurate, or at least practically accurate. If the little capsule with the assay be allowed to stand merely covered with paper or a watch-glass for the 48 hours, some of the solution will evaporate away, and form a hard ring of dried extractive matter upon the capsule all round the edge of the liquid, and this would be subsequently weighed as morphia. A pellicle forms on the surface too, and in whole or in part remains in the capsule when the mother liquor is poured off. By the simple device of covering the capsule, and preventing all change of air by a water joint, as described, all this inconvenience is avoided. And beside, the water absorbs the vapor of ammonia as the excess of this precipitant is given off from the solution, and diminishes this excess about as well as if the capsule was left exposed for it to fly off. At the end of the 48 hours the mother-liquor is poured off clean from the adherent crust of morphia which lines the capsule, and the capsule is supported on edge upon some folds of bibulous paper for half an hour to drain. It is then put in a larger capsule on the water bath for an hour to dry, when it is ready for weighing. This weighing should be done on a scale sensitive to about the eighth or the fourth of a grain, and with good weights of course. The capsule and contents are weighed, and the tare or weight of the capsule is subtracted; and the weight of morphia thus ascertained will be in proportion to the quality of the opium. If the powdered opium be within the officinal limit the morphia will weigh not less than 7·72 grains or 0·5 gramme, but it may weigh anywhere between this and say 15·4 grains or 1 gramme. Now as the whole of the solution represented the whole of the opium, and as one-seventeenth of the solution has yielded a quantity of morphia which is now known, it is only necessary to multiply this quantity by 17 in order to know what the whole solution would have yielded if precipitated in this way; or to

multiply it by 16 to know how much morphia the remaining sixteen-seventeenths of the solution contains. Suppose the morphia in the capsule to weigh 11·42 grains or 0·74 gramme. Then 11·42 × 17 = 194·14, and the 1543 grains of powdered opium taken contained 194·14 grains of morphia. Then, as 1543 : 194·14 : : 100 : 12·58 = the percentage of morphia in the opium. Or, it weighs 0·74 gramme. Then 0·74 × 17 = 12·58, and the 100 grammes taken contained 12·58 grammes of morphia. Then, as 100 : 12·58 : : 100 . 12·58 = the percentage of morphia in the powdered opium. But there is only sixteen-seventeenths of the solution remaining, and the other seventeenth part in this supposed case has given 11·42 grains or 0·74 gramme of morphia. Therefore, this quantity multiplied by 16 would give 182·72 grains or 6·04 grammes as the whole quantity of morphia in the remainder of the solution.

This is by no means the only process of assay well adapted to this purpose, and perhaps not the best one. Any of the ordinary morphiometrical processes are good enough, and here, as in most chemical processes, that one is best to which the operator is best educated, and with which he has most experience. A practice of nearly twenty years, growing out of the old Staples process for the extraction of morphia, has led the writer to place a good deal of confidence in this plan; and though it does not pretend to critical accuracy, it is doubtful whether any process that is more complex, more difficult, or more critical, would be adapted to the present condition of pharmacy. Pharmacy should not pretend to be chemistry, and results in this direction which may be far short of chemical accuracy would be an important advance for pharmacy. Simple and easy processes of assay are alone applicable to pharmacy, and the practice of such soon leads to greater accuracy in these first, and then to more accurate processes. This process of assay is easily applicable to powdered opium, and gives results the accuracy of which is proportionate to the dexterity with which it is applied. If a parcel of powdered opium is to be assayed by this process, it is only necessary to take 10 grammes = 154·3 grains, instead of 100 grammes = 1543 grains, and then to divide the whole detail as given by 10. Indeed, the whole detail given is but the writer's process of assay

for opium multiplied by 10, and to him it appears both simple and easy, and has often been verified by extractions of morphia on the large scale by various processes.

Now it is probable that the average yield of morphia from good powdered opium now-a-days will not be over 10·5 to 11 per ct. And the officinal tincture, containing 1·25 troyounces or 600 grains of such opium to the pint, would therefore contain 63 to 66 grains of morphia to the pint. Hence 64 grains of morphia to the pint, or 4 grains to the fluidounce, is assumed as the standard of strength of the officinal tinctura opii, or laudanum.*

This assumed strength for the officinal tincture has always been used as the standard of strength for liquor opii compositus, and will continue to be so.

It is therefore only necessary to divide the number of grains of morphia contained in the remaining sixteen-seventeenths of the depurated solution by 4, in order to obtain the number of fluidounces of 30 cc. each, to which the solution must be made up when finished for use. In the supposed case the 182·72, or say 183 grains, divided by 4, gives 45·75 fluidounces, or 1372 c.c., as the measure for the finished solution.

Now if it be desired to make the simple liquor opii, as suggested on page 87, it is only necessary to add water and alcohol in the quantities indicated by the assay, keeping the proportion of alcohol as small as may be with safety. With one-sixth of its weight of alcohol the preparation would probably keep indefinitely, and could then be used by hypodermic injection.

When the solution is to be made into liquor opii compositus, the proceeding is less simple.

Thirty cubic centimetres or a fluidounce of the preparation, when carefully and accurately made on the basis given on page 39, weighs from 28·95 to 29·05 grammes, or from 446·76 to 448·30 grains, varying to this extent only when made from different parcels of good, and only fair quality powdered opium. Twenty-nine grammes, or four hundred and forty-seven and a

* Morphia ($\overline{Mo}$ = 303) is to crystallized sulphate of morphia ($\overline{Mo}$, $SO_3$, $6HO$,=379) as 303 is to 379 or thereabouts, and therefore 4 grains of morphia is about equivalent to 5 grains of crystallized sulphate of morphia.

half grains, is therefore adopted as the standard weight of thirty cubic centimetres, or one fluidounce of a properly made preparation, measured at 17° C.=62·6 F.

This would indicate the following composition or formula for each 30 c.c. or 1 fluidounce of liquor opii compositus:

Depurated solution of opium containing,—

| | | | |
|---|---|---|---|
| 4 grs. morphia, | 14 c.c.=15·047 grms., | =232·17 grs. | =51·887 p.c. |
| Stronger alcohol, | 13 c.c.=10·686 " | =164·91 " | =36·848 " |
| Purif. chloroform, | 1 c.c.= 1·499 " | = 23·13 " | = 5·169 " |
| Acetic ether, | 2 c.c.= 1·768 " | = 27·29 " | = 6·096 " |
| | 30 c.c.=29·000 " | =447·50 " | =100·000 " |

When it shall have been determined by the assay how many fluidounces of the finished preparation the solution will yield, this number of fluidounces is to be multiplied by 447·5, or the number of grains in each fluidounce when finished, and the product will be the weight in grains of the finished preparation. This number of fluidounces multiplied by 164·91, or the number of grains of alcohol in each finished fluidounce, will give the weight in grains of the whole quantity of alcohol required. But a constant quantity of 1574 grains of the alcohol is required in, and has already been added to the watery solution before the assay, and therefore this quantity must be subtracted from the whole quantity required, and the remainder, only, must be taken for the final adjustment. This same number of fluidounces of the finished preparation multiplied by 23·13, or the number of grains of purified chloroform in each finished fluidounce, will give the whole weight in grains of chloroform required. The same number of fluidounces of the finished preparation multiplied by 27·29, or the number of grains of acetic ether in each finished fluidounce, will give the whole weight in grains of acetic ether required. These calculations are really simple, and may be usefully illustrated by continuing the supposed case taken to illustrate the application of the assay.

The 182·72 grains of morphia found to be in the remainder of the solution assayed (the 16 fluidounces or 480 c.c.), divided by 4, gives 45·75 fluidounces or 1372 c.c. as the measure for the finished liquor opii compositus when it shall contain the required

four grains of morphia in each fluidounce. Then 45·75 fluidounces multiplied by 447·5 grains, the weight assumed for each fluidounce of the finished preparation, gives 20473·125 grains, which is the weight to which the solution must be made up in finishing it. Then 47·75 × 164·91 = 7544·63, which is the whole number of grains of alcohol to be contained in the finished preparation. But the constant quantity 1574 grains of alcohol has already been added before the assay, and therefore this must be subtracted from the whole quantity. Then 7544·63—1574 =5970·63, which is the number of grains of alcohol still required to finish the preparation in this supposed case.

This latter quantity is weighed into a tared bottle which will hold the entire finished preparation.

Then 45·75 × 23·13=1058·20, which is the number of grains of purified chloroform required. This is weighed in any convenient vessel, and poured into the bottle containing the alcohol. Then 45·75 × 27·29=1248·52, which is the number of grains of acetic ether required. This is weighed in the vessel used for the chloroform, and is also poured into the bottle with the alcohol. The bottle is then shaken to mix the contents, the assayed opium solution added, and the bottle again shaken. This remainder of the assayed opium solution weighed 7407 grains, and consisted of 5926·6 grains of watery solution and 1481·4 grains of alcohol. It originally weighed 7870 grains, and consisted of 6296 grains of watery solution and 1574 grains of alcohol, but 463 grains of the mixture (370·4 grains watery and 92·6 grains alcohol) was taken for assay. The bottle now contains of

| | | |
|---|---|---|
| Assayed opium solution, | 7407·00 | grains. |
| Remainder of the alcohol, | 5970·63 | " |
| The chloroform, | 1058·20 | " |
| The acetic ether, | 1248·52 | " |
| Making, | 15,684·35 | " |

But it is required to weigh 20,473·125 grains, and this weight is to be made up with water. Therefore, 20,473 grains less 15,684 grains gives 4789 grains as the quantity of water required to complete the weight and finish the process.

Leaving the completed illustration now, and resuming the

formula: Take a tared bottle of sufficient capacity to hold the finished preparation, and having weighed into it in succession the remainder of the alcohol required, the purified chloroform and the acetic ether, shake them together and then add the opium solution. Then set the bottle on a scale, and having carefully adjusted the weights to the required complete quantity, add water until this quantity be made up, and shake the mixture. Upon first adding the water the mixture becomes cloudy and suffers contraction and consequent rise of temperature, and if measured now, to control the weighing, the measure will be found plus. But after standing over night, the measure should be found pretty nearly accurate, if the measures used be good. The French litre and half-litre flasks, and a pipette graduated upward in cubic centimetres to 30 or 50 cubic centimetres, are not only extremely useful in this process, but also for many uses, and particularly for testing the accuracy of graduated measures.

When the completed preparation is well shaken, the cloudiness disappears, and it gives a clear bright solution of a deep brownish or yellowish garnet color, and having a rather oily fluidity as it drains down the sides of a glass vessel. The taste is sweet, pleasantly aromatic and somewhat pungent at first, but soon passes to a peculiar, not intense bitterness—the bitterness being that of other opium preparations, but less intense, less disagreeable, and less persistent, and comparatively if not wholly free from the nauseous quality of the opium bitterness. The odor is a refreshing agreeable admixture of the acetous pungency of the acetic ether and the sweet pungency of the chloroform, and recalls that of the vinaigrette smelling-bottle used as a restorative by the ladies. It is miscible in all proportions with alcohol, water, wine, syrup, etc., and is thus well-adapted to compounding in prescriptions. It is perhaps best given in water, the quantity of water being varied at pleasure, but generally limited to the smallest convenient quantity—say, a teaspoonful or a tablespoonful of ice water to each dose. When first mixed with water the mixture is cloudy, but this cloudiness is only momentary.

The dilution, and the irritant action of the chloroform, acetic ether, and the large proportion of alcohol, interfere materially with its application by hypodermic injection. The old liquor

opii compositus was badly adapted to this mode of administration, but was still often so used. This new formula is, however, much less applicable to use in this way. It may, however, be rendered applicable in precisely the same way not unfrequently adopted with the old preparation, namely: by exposing a weighed small quantity at a time, in a shallow vessel in a warm place, until the weight is reduced to one-half or one-third. If reduced to one-third, it will be about the strength of the solution of sulphate of morphia called Magendie's solution; but it will then have too little alcohol to keep longer than a few weeks. If reduced to one-half, the chloroform and acetic ether and much of the alcohol will pass off sufficiently, and yet leave enough alcohol to preserve it. If the alcohol be all or nearly all driven off, the effect of very dilute solutions of phenol, or the so-called carbolic acid, in protecting solutions for hypodermic use from change, may be resorted to. All solutions for such use should be perfectly clear and bright, either by settling or by filtration, and should be carefully guarded against decomposition, since many of the accidents which occur in hypodermic medication are probably caused by the introduction of liquids which are undergoing change, or by inoculation from a badly kept or imperfectly cleaned syringe point.

The compound solution of opium evaporated on a water bath to one-fourth its weight or less, then diluted to one-third its original weight with water, and, when cold, filtered, will give the best solution for hypodermic use. But the coloring and extractive matter is objectionable for this use. If such a solution is to be kept even for a few days (and no hypodermic solution should ever be kept long), it may be protected by the addition of about one-fiftieth of its weight of an alcoholic solution of phenol (crystallized carbolic acid) containing two per cent.

In conclusion, it may be remarked in connection with this liquor opii compositus, as in regard to other agents which are liable to become hobbies, that perhaps the greatest skill in using it is to know when to prefer something else.

*Brooklyn, Dec.* 15, 1869.

## ON TINCTURA OPII CAMPHORATA.

By J. B. Moore.

℞. Powdered Opium, No. 50.

| | | |
|---|---|---|
| Benzoic Acid, | *aa.* | sixty grains. |
| Camphor, | | forty " |
| Oil of Anise, | | a fluidrachm. |
| Clarified Honey, | | two troy ounces. |
| Alcohol. | | |
| Hot Water, temp. 200°, | *aa.* | one pint. |
| Diluted Alcohol, q. s. | | |

Pour the hot water upon the powdered opium in a covered vessel, stir well, and when sufficiently cool, transfer to a stoppered bottle, and macerate with occasional agitation for three hours; then strain the infusion through muslin, with expression, macerate the residuum with the alcohol in a stoppered bottle, in like manner, for three hours longer, then strain and express as before. Mix the infusion and filter, and upon the drugs packed in a small glass percolator, pour gradually the filtered mixture, and when it has all passed, continue the percolation with diluted alcohol until two pints of tincture are obtained.

Then dissolve the camphor in the oil of anise in a mortar, and to the solution add the benzoic acid and rub well; to this add gradually the honey and rub until a smooth mixture is formed. Lastly, add this to the two pints of tincture first obtained, shake well and filter.

This is an expeditious mode of making paregoric, and affords a faultless preparation. When carefully manipulated, the opium is so thoroughly exhausted as to be deprived of taste.

The mixed infusions are directed to be filtered before percolation, in order to remove the resin and caoutchouc taken up by the alcohol and which separate when the infusions are mixed, which, if not previously removed, somewhat embarrasses percolation.

The filtration and percolation can both be conducted at the same time, and the filtrate supplied to the percolator as it passes.

When the tincture is prepared in the quantity of a gallon or

more at a time, the increased bulk of opium can be more conveniently adjusted in the percolator than when such small quantities are worked.

The writer would state in this connection that, in his article on tincture opium, which appeared in the last number of this Journal, he omitted, in the first line of the directions to that process, the following words: "*in the hot water,*" which should have followed "*powdered opium.*"

*Philadelphia, October*, 1869.

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## NOTE ON CAMPBELL'S PROCESS FOR FLUID EXTRACTS.

By George W. Kennedy.

To the Editor:

Dear sir, allow me to make a few remarks on Campbell's process for fluid extracts. Being in a large house in this city in charge of the prescription department, and using hundreds of pounds of fluid extracts, at wholesale and retail, annually, until lately, all our stock of them was received from Northern houses. Not being satisfied with their quality, I suggested to the firm to make the fluid extracts, in connection with the other business, which was agreed to. Among the objectionable fluid extracts was one of buchu, which could hardly be recognized by its odor, and when examined was found to yield but one-fourth of one per cent. of volatile oil, whilst the drug contains from three-fourths of one per cent to one and a half per cent., according to the variety.

I think the time has come when every druggist should prepare the fluid and solid extracts he sells, to protect himself from worthless or inferior preparations, which are to be found in commerce. The excuse is that too much time and trouble are required, but they would gain reputation and business two-fold by doing so.

I first made 20 lbs. of fluid extract of buchu according to Mr. Campbell's process, and found it to be a very fine extract. The dregs left when percolated with alcohol of ·835 sp. gr. did not show the presence of volatile oil or resin when water was added, and had no odor of buchu whatever.

The next operation was 40 lbs. of fluid extract of wild cherry (cerasus serotina). This, I think, is the most troublesome of all the fluid extracts, and the result here was the same as with the buchu. I think the glycerin process should be used in making all the fluid extracts, and particularly in this one, for which it seems well adapted.

The next substance treated was vanilla. I took an ounce of vanilla, cut it transversely into small pieces, rubbed it into powder with sugar, moistened it with a mixture of one part of glycerin and three of alcohol, and packed it into a conical glass percolator; let it stand four days, and then percolated with a mixture of two parts of alcohol and one of glycerin, and one of water until a pint of liquid passed; forming a very fine extract.

I think the proportion of menstruum used to moisten in the resinous drugs, such as ginger, lupulin and podophyllum, is too great; twelve fluid ounces being preferable, adding the balance after the four days maceration, and continue the percolation until the displacement is effected. I never insert the cork; using a piece of fine sponge in the neck of the percolator.

*Memphis, Tenn., Nov.* 5, 1869.

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## ON COLD CREAM.

By J. B. Moore.

Ceratum Galeni, unguentum refrigerans, or cold cream, as it is more popularly known, is of more ancient origin than many would suppose, having been invented by that learned and distinguished physician Claude Galen, who was born at Pergamus, in Asia Minor, A. D., 131. The formula of this popular ointment has undergone many transformations since its birth, more perhaps than that of any other preparation in our officinal list. In fact almost every one has his own peculiar way of making cold cream, and there are but few pharmacists who prepare this time-honored ointment by the same recipe. Besides the numerous formulas that have been published in the various pharmaceutical journals, I find collected together, in the Pharmacopœia Universàlis, edition 1833, from the various Pharmacopœias of the

world and other sources, not less than twenty-six. Nearly all of the old formulas contain lard as the base, a few have the addition of wax and suet. The first mention that I have found of the employment of the oil of sweet almonds and spermaceti, is in Coxe's American Dispensatory, edition 1831. In a note the author says: "Under the name of unguentum aqua rosæ, the U. S. Pharm., and of Phil., direct two ounces of oil of almonds, half an ounce of spermaceti and one drachm of white wax, to be melted in a water bath; and two ounces of rose water, to be stirred till the mixture is cold. The New York Pharm. has, we think, done well to discard such trumpery, at least under any supposition of the *two ounces of rose water being medicinal.*" So I presume that the present almost universal mode of making this ointment of oil of sweet almonds, spermaceti, etc., is the offspring of our own Pharmacopœia.

The names by which this preparation has been designated are almost as various and numerous as the formulas offered for its manufacture.

As a matter of curiosity, and to show to those who are not already aware of it how this ointment was prepared in the days of *yore*, I will append a formula which I copy from an old and valued relic in the possession of the writer, a copy of an old London Dispensatory, edited by Nicholas Culpeper, published in the year 1650, and now nearly 220 years old. Judging from a survey of the contents of this book, I am forced to the conclusion that pharmacy at that period was *really* in its infancy. Many queer old formulas, with directions and observations by the author, couched in quaint and, now-a-days, ludicrous language and expressions, are to be found therein.

I copy the formula, with the comments of the author, *verbatim et literatim:*

"Unguentum refrigerans, Galenus.

It is also called a cerecloath.

Take of white wax four ounces, oyl of roses omphacine a pound; melt in a double vessel, then powr it out into another, by degrees putting in cold water, and often powring it out of one vessel into another, stirring it till it be white; last of all wash it in rose water, adding a little rose water and rose vineger.

A. It is a fine cooling thing, (for what denomination to give it I scarce know) and exceeding good, yea super-excellent to cure inflamations in wounds or tumors."

The above, I presume, is the original formula of Galen.

I will now present a formula for cold cream which I have employed for several years with unusual satisfaction. It affords an elegant ointment and of good consistency, of sufficient firmness in summer and not too hard in winter. It also possesses the desirable quality of keeping well at all seasons. I consider it greatly preferable to that prepared with rose water for popular use; and is also eligible as a substitute for the officinal ungt. aquæ rosæ for almost any purpose. Should the proportions given yield a preparation of too firm consistence in cold weather in some sections of the country, the quantity of wax may be lessened. The quantity and kind of perfume may also be varied to suit the fancy.

| ℞ | | | |
|---|---|---|---|
| | Ol. Amygdal, Dulc. | f℥ xss. | |
| | Cetacei | ℥iij ʒvj. | (Troy) |
| | Ceræ Albæ | ʒ. x. | |
| | Ol. Rosæ | gtt. vj vel gtt. x. | |

Melt together, by means of a water-bath, the oil, spermaceti and wax, and strain through muslin if necessary; stir constantly until it begins to thicken; then beat it well, and when it has become quite cool add the oil of rose and continue the beating process till the oil is thoroughly incorporated and the ointment is of a snowy whiteness. Any stray portions that might unavoidably harden upon the sides of the dish should be removed, and rubbed perfectly smooth upon an ointment slab, before admixture with the rest.

The true secret in making an ointment of this kind nicely, consists in stirring and beating it well while cooling. A little extra labor bestowed upon this part of the operation will be well spent, and amply repaid by the enhanced beauty and elegance of the product.

A capacious porcelain evaporating dish should be employed, in which to prepare this ointment.

Special care should be taken in the selection of the ingredients, and none but fresh, sweet and strictly pure should be

used, and the use of the water-bath should never be omitted, as it precludes the liability of injury by heat.

Some pharmacists add glycerin to their cold cream, but I cannot perceive any advantage whatever in its use, and as it has no affinity with the other ingredients, it does not make as smooth nor as handsome an ointment as can be made without it. And medicinally, I think, it adds nothing to the value of the preparation beyond the imagination.

*Philadelphia, Dec.*, 1869.

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## ADIRONDACK MINERAL SPRINGS.

By John Bell, M. D.

Among the mineral springs of recent discovery which seem to be entitled to claim attention for their medicinal properties, we find the Adirondack. This spring derives its name from its flowing from the base of one of the spurs of the Adirondack mountains, in the town of Whitehall, and at the head of Lake Champlain, in the State of New York. The water may be regarded as a saline chalybeate, and by French writers acidulous chalybeate, with a considerable quantity of free carbonic acid. After being at rest for a time it allows of a precipitate of a reddish color, which disappears by shaking. It is without smell and any very marked taste.

An analysis of Water of the Adirondack Mineral Spring, by Professor Collier, of Vermont University, Burlington, gives the following results:

*One Imperial Gallon* of 70,000 grains.

| | |
|---|---|
| Sulphate of Lime, | 11·134 grains. |
| Carbonate of Lime, | 18·543 " |
| Carbonate of Magnesia, | 16·618 " |
| Carbonate of Iron, | 5·040 " |
| Carbonate of Manganese, | traces |
| Carbonate of Potash, | 5·317 " |
| Carbonate of Soda, | 5·135 " |
| Carbonate of Lithia, | ·023 " |
| Chloride of Sodium, | 14·340 " |
| Alumina, | traces |
| Insoluble Residue, | 7·42 " |
| | 76·892 |

Free Carbonic Acid, 67·3 cubic inches.

We see from the above analysis that the Adirondack is distinguished from the general run of mineral waters by its containing a larger proportion of iron and the alkalies, potassa and lithia, all in the form of carbonates. In looking over the analyses of the different mineral springs of Europe, we find but two, Bourbon L'Archambault and Cransac, both in France, which can compete as chalybeates with the Adirondack potassa and lithia, which exist in appreciable quantity in the latter spring, are, in nearly all others, entirely absent, or exhibit *traces* only of their presence. We must except from this remark, as relates to lithia, its large proportion in some of the springs at Saratoga, and in two new artesian wells at Ballston.*

Every newly discovered mineral spring must be regarded as an acceptable addition to our Materia Medica, and the Adirondack is presented to us as a medicinal agent, possessing marked curative powers in different diseases. Those in which it has been found most efficacious are *sub-acute and chronic rheumatism* and *affections of the kidneys and bladder;* after these come *dyspepsia* and certain *cutaneous eruptions.* Cases coming within my own observation and those kindly communicated to me by professional brethren of this city, confirm the statements of the medical gentlemen at Whitehall, and of other intelligent persons, going to show the very decided operation of this water as a diuretic, and under circumstances too in which the most approved medicines of this class had failed to produce the desired effect. In nephritic calculi or gravel, complete relief has been obtained, and in two cases the water, to use the expressive language of one of my informants, "washed out" calculi, and at the same time freed the patient from discharges of bloody urine and mucus, and one of them from albuminuria. A case of obstinate rheumatism, in which the knee joint had been long affected, and the usual remedies tried without avail, yielded to the free and somewhat prolonged use of the water. That most troublesome, and so often unmanageable disease, *diabetes mellitus,* has been not only arrested in its course, but cured, by drinking of the Adirondack water—on the testimony of Drs. Long, Gordon and Bennett, of Whitehall. Dr. Shumway, of

* Chemical News, September, 1869.

the same place, after having used it on himself, and watched the experience of its curative powers on others, dwells on its great value in diseases of the urinary organs, and adds, "all chronic cutaneous eruptions, blotches on the face, including that intractable eruption *acne punctata*, have been entirely removed." With a knowledge of its actively diuretic operations it is easy to infer the adaptation of this water to dropsy, and to various forms of chronic derangement, including atonic dyspepsia and imperfect secretion from the liver. Its largely alkaline and chalybeate character would induce trials of it in heart-burn and water-brash, and in diarrhœa assuming a chronic form. Its efficacy has indeed been tested with success in the last of these diseases. In full doses the water acts, although not with any uniformity, as an aperient; but its apparently slight action in this way is accompanied by effects on the biliary secretion of a more decided character than would be produced by strong purgatives.

The quantity of the water to be taken is a half pint tumblerful three times a day, in diseases of the kidneys and bladder, and when a laxative effect is desired. In skin affections, half a glass three times a day will suffice, and, at the same time, the water, made tepid, is to be applied externally.

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## NOTE ON A SAMPLE OF SO-CALLED OPIUM FROM ILLINOIS.

By William Procter, Jr.

This "opium" was deposited by Dr. D. G. Plummer, in the exhibition of drugs, etc., at Chicago, in Sept. 1869. It was in the form of a block, two inches square and four or five inches long, of a dark greenish-brown color, narcotic odor, and soft uniform consistence, having much the appearance of a good narcotic extract. A section of this, weighing about an ounce, was presented to the writer, with the requst that it should be examined. On inquiry as to the manner of obtaining this substance, it was understood to be made by the process of Wilson, of Vermont opium notoriety, by expressing the juice from the whole plant, leaves, stalks, and capsules, and evaporating the juice to the proper consistence without any extraction of the

special juice of the capsules by incision. It was hence inferred to be very meagre in alkaloids.

Before the assay the sample had lost much moisture, was tough, nearly dry, and with a dark-brown resinoid fracture. Of this, 100 grains was rubbed down with a little water in a mortar to a smooth paste, more added and percolated in a funnel till the dregs were exhausted. The liquid was treated with lime, muriatic acid and ammonia, by Mohr's process, (noted in last volume,) and set aside for 24 hours. The precipitate collected in a filter, washed and dried, weighed 0·5 grain, much colored. This was treated with boiling alcohol, and the alcoholic solution evaporated, a minute yellowish white crystalline residue was obtained, which reacted like morphia with nitric acid and sesquichloride of iron. As this product did not represent more than one-fifth of one per cent., assuming it all to have been morphia, it is sufficient evidence of the worthlessness of this so-called "opium," which is in reality merely extract of poppies.

PHILA., Dec., 1869.

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## ON GLYCERIN LOTION.

BY J. B. MOORE.

Upon the advent of cold weather nearly every one feels the need of some preparation to apply to the face and hands, to prevent and cure chaps, roughness and irritation of the skin, caused by exposure to the cold during the winter and spring seasons of the year. Almost every apothecary has more or less demand for a remedy of this kind, and many include some appliance of this character among their *specialties*. Having what I consider a most excellent recipe for such a preparation, I here offer it for the benefit of those who wish to make such a preparation, and have not already a better formula:

| | | |
|---|---|---|
| ℞. | Glycerin, | f℥iij |
| | Mucilage Quince Seeds, U. S. D., | f℥x |
| | Pulv. Cochineal, | grs. v |
| | Hot Water, | f℥iss |
| | Deod. Alcohol, | f℥iiss |
| | Oil Rose, | gtt. viij |
| | Pulv. Gum Arabic, | ℥ss |
| | Water, | f℥viij |

Rub the powdered cochineal first with the hot water gradually added, and then add the alcohol. Then triturate the oil of rose well with the powdered gum arabic, and gradually add the water as in making emulsion. With this mix well the solution first formed and filter, and to the filtered liquid add the glycerin and mucilage of quince seeds, and shake well.

The mucilage of quince seeds should always be freshly made. If the alcohol is sweet and free from foreign odor, and the glycerin perfectly inodorous, a less quantity of oil of rose may suffice.

If care is taken in its manufacture, this will form a beautiful and elegant preparation, with a rich rosy fragrance.

When applied to the skin it imparts an agreeably soft, smooth and *velvety* feel. It is an excellent application for the face after shaving.

I have tried many similar combinations, but have never sold an article that has been so generally admired and so universally popular as this.

*Philadelphia, Dec.*, 1869.

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## *ON LYCOPODIUM CLAVATUM*, LIN., AND OTHER NORTH AMERICAN SPECIES AS A SOUPCE FOR LYCOPODIUM.

By John M. Maisch.

The club moss, *Lycopodium clavatum*, Lin., and two or three allied species of the same genus, grow in the temperate zone of the northern hemisphere, particularly in the northern half thereof. The Lycopodium of commerce is mostly collected in the mountains of Switzerland and Germany; that collected in Poland and Russia is usually less handsome in appearance, and is regarded as of inferior quality.

The sporangia in the genus Lycopodium are situated in the axils of the leaves. Two species indigenous to North America, *Lyc. lucidulum*, Mich., and *Lyc. selago*, Lin., have the sporangia scattered along the stem, and consequently ripen but few at a time, so that these species are unfit for the collection of the sporules. The other North American species, seven in number, have the sporangia collected in spikes. Two of these are rather

too small for the collection of the sporules, namely: *Lyc. inundatum*, Lin., which is common in the Northern States and Canada, and *Lyc. alopecuroides*, Lin., which is most abundant in the Southern States,

Of the remaining five species *Lyc. dendroideum*, Mich., and *Lyc. complanatum*, Lin., are perhaps diffused over the greater area, while *Lyc. Carolinianum*, Lin., is confined chiefly to the Southern States, and *Lyc. clavatum* and *annotinum*, Lin., are most abundand northward.

In Europe lycopodium is collected indiscriminately from those species which yield the largest amount of sporules, and these of a size not exceeding those of the true club moss; *Lyc. clavatum*, *complanatum* and *annotinum* are almost exclusively used. The spikes are collected during the months of August and September, dried in suitable vessels in such a manner that no loss of sporules can occur from wind or draft, and the spores are then obtained by beating and rubbing, whereby the sporangia are ruptured; the resulting powder is then passed through a fine sieve to separate fragments of leaves, spore capsules and other accidental impurities.

To the three species mentioned, *Lyc. dendroideum* might be added in this country as a source for commercial Lycopodium, and this might be most advantageously collected in the Eastern States and in Canada. Since, however, the yield is small from the bulky spikes, it is the writer's opinion that the collection of Lycopodium in North America will scarcely pay, owing to the greater value of labor, as long as the European article of unexceptional quality can be bought in this country at from 50 to 70 cents currency per pound.—*Proc. Amer. Pharm. Assoc.*, 1869.

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## COMPOUND ELIXIR TARAXACUM—THE BEST VEHICLE FOR QUININE.

By P. C. Candidus.

I present to the A. P. Association a formula for the above elixir, which I prepared about eight months ago, at the request of Dr. Jerome Cochran, Professor of Chemistry at the Mobile Medical College. He wanted the virtues of Prunus Virg., Taraxacum, and Gentian—the latter in small proportion:

℞. Rad. Taraxaci, ℥vj., or Ext. Tarax. fluid. f. ℥vi.
Cort. Pruni Virg., ℥iv.
Rad. Gentianæ, ℥i.
Cort. Aurantii, ℥ii.
" Cinnamomi,
Sem. Coriandri, ää, ℥i.
" Anisi,
" Carvi,
" Card., ää, ℥ii.
Rad. Glycyrrh., ℥i.
Syrup. Simpl., Oiiss.
Alcohol and water, in the proportion of 1 of the former to 3 of the latter, a sufficient quantity.

The dry ingredients must be reduced to a suitable degree of fineness for percolation. Mix the alcohol and water, moisten the powder with 6 oz. of the mixture, then pack in a conical percolator, and pour on of the alcoholic mixture until 6½ pints are obtained, then add the syrup and mix them.

Dr. Cochran prescribed it a great deal, mostly as an adjuvant and vehicle of other medicines. One day a gentleman came in to take a dose of quinine. I looked about for something for him to take it in, when my eye fell on the above elixir. I mixed it for him, and to his surprise it was tasteless. As he felt doubtful of its being quinine, I mixed up some for myself, and it proved to be completely masked. I sent some to several physicians, who pronounced it a success. Dr. E. P. Gaines, and other leading physicians, have been prescribing it ever since to their own and their patients' satisfaction. The quinine should be mixed with the elixir at the time it is taken, although when mixed for several days it is still tasteless.

The dose of the elixir is from half to one ounce, and it is no doubt better than the popular stomach bitters flooding the country. —*Proc. Amer. Pharm. Assoc.*, 1869.

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## ON A PROTECTIVE AGENT AGAINST MOTHS AND OTHER INSECTS.

By George F. H. Markoe.

Query 16th.—What is the best substitute for camphor for the protec-

tion of woolens from moths and other insects, that will be cheaper and more effective

In reply to this query the writer would suggest the use of naphthaline as a substitute for camphor. It is an effective protective agent against the ravages of moths and other insects among woolens and in natural history collections.

When purified, naphthaline is obtained in beautiful crystalline masses, possessing a strong peculiar odor, recalling the smell of coal-tar creosote. In its crude state the crystals are of a brown color, and the odor much more intense than when purified.

Naphthaline has been put to a thorough test by Prof. Asa Gray in Harvard College Herbarium, and in the cabinets of the Boston Society of Natural History. The results obtained in these trials were highly satisfactory and conclusively proving the value of naphthaline as a protective agent against the ravages of the destructive insects that infest woolens and the cabinets of museums.

It is very cheap, being a waste product in the distillation of coal-tar for which no practical use has been found except for fuel and for the manufacture of lampblack,* The only objection the writer can find to its use is its strong odor, which to many people is very disagreeable; this fact will alone prevent naphthaline from becoming a popular substitute for camphor, at least so far as its application to the protection of clothing is concerned; but for use in natural history collections it leaves little to be desired.—*Proc. Amer. Pharm. Association*, 1869.

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## ON CHLORAL.

By Professor Charles A. Joy.

This interesting compound was discovered in 1832, by Liebig, and was obtained by the action of chlorine upon absolute alcohol. The name is significant of its origin, and suggests at once the method of its manufacture. Chlorine alcohol is abbreviated to chloral, just as aldehyd is al(cohol of) hyd(rogen). The Germans have a name for chloral so long that it ought to be mentioned as a curiosity. They call it trichlormethylhydrocarbonoxyd, and sometimes trichloracetoxylwasserstoff, and, again, trichloraldehyd, or trichloracetyloxydhydrat. It is not proba-

* Naphthaline is now used in making dye colors and in the artificial production of benzoic acid.—Editor Am. Journ. Pharm.

ble that the medical profession will adopt any of the long names in making up their prescriptions, but that chloral will reign in all its simplicity. It is worthy of note that nearly simultaneously with Liebig's discovery of chloral in Germany, was Guthrie's preparation of chloroform in the United States, and it is somewhat remarkable that, while the former is just coming into notice as an hypnotic agent, the latter has been employed since 1847 as an anæsthetic, and the present investigations upon it would not have been undertaken if it were not for its relations to chloroform. Although Liebig first prepared chloral, yet we are chiefly indebted to Dumas for a knowledge of its properties and constitution, just as we were for the best investigations upon chloroform. In order to understand how chloral can be made from alcohol, it would be well to write down the formulas of alcohol, aldehyd, &c., and then trace the decomposition that takes place:

| | Old. | New. |
|---|---|---|
| Alcohol, | $C^4H^6O^2$ | $C^2H^6O$ |
| Aldehyd, | $C^4H^4O^2$ | $C^2H^4O$ |
| Chloral, | $C^4Cl^3HO^2$ | $C^2HCl^3O$ |
| Chloroform, | $C^2HCl^3$ | $C\,HCl^2$ |

When chlorine is passed through absolute alcohol, we can see, from the above table, how it takes the place of hydrogen, and forms hydrochloric acid. The reaction may be represented by the following formula, $C^2H^6O+8\,Cl=C^2HCl^3O+5\,HCl$. The actual manufacture of chloral is attended with considerable difficulty and expense.

It is necessary to pass well dried chlorine gas through pure anhydrous alcohol for many hours, as long as it is absorbed, and to keep the vessel cool in the early stages of the operation; later, the temperature must be gradually raised until the liquid boils. If dilute alcohol be employed, instead of the anhydrous, no chloral is formed, but, in its stead, aldehyd, acetic acid and hydrochloric acid; hence the necessity of using absolute alcohol. It is also difficult to prevent the formation of other compounds, especially chloride of carbon, which serve to contaminate the chloral and render its administration dangerous. After the chlorine has been passed through sufficiently long, the crude product is mixed with three times its bulk of oil of vitriol and

distilled at a gentle heat. It is sometimes necessary to repeat this operation several times, and finally to distil over quick lime. This is a long and tedious process, and it is not at all probable that it will be followed on a large scale should there be a demand for chloral in medicine. The action of chlorine upon bodies that yield alcohol by fermentation, such as starch, sugar, &c., will be tried, and even wood, after it has been treated with sulphuric acid, might afford it when acted upon by chlorine. Professor Staedeler, formerly of Gottingen, now of Zurich, thought of the possibility of such a reaction, and actually succeeded in making chloral by distilling a mixture of one part of starch (or sugar) with seven parts of hydrochloric acid and three parts of peroxide of manganese; formic acid, carbonic acid and other bodies accompanying it. Some of these latter methods may eventually prove successful, and thus enable us to obtain chloral at a cheap rate. At a recent meeting of the Chemical Society of Berlin, a pound of chloral hydrate was exhibited by two chemists, Martius and Mendelssohn, who stated that, with the co-operation of Dr. Liebreich, they had discovered a cheap and easy method for its preparation, but they refrained from giving the method because they were not through with the research. We also understand that the hydrate is offered for sale in Berlin for about a dollar, gold, per ounce. As a dose only consists of a few grains, an ounce can be made to go a long way, and the price may be considered very moderate. We can hardly expect to procure it in this country for any such price until the demand for it has occasioned the discovery of cheap methods for its manufacture. We are sorry not to be able to give more definite hints in reference to a new way of preparing it, but we feel confident that our skillful pharmaceutists will soon be able to get on the right tract.

We now propose to give an account of the properties of chloral. It is a limpid, oily, colorless liquid with a fatty taste, and a strong caustic smell, producing lachrymation. Its specific gravity is 1·502, and it boils at 95°C., and can be distilled unchanged. It mixes in all proportions with water, also with ether and alcohol. It dissolves sulphur, phosphorus, bromine and iodine, and combines directly with water to form a hydrate. A little

chloral put into a moist flask deposits star-shaped crystals of the hydrate on the sides. The aqueous solution of chloral is indifferent to vegetable colors; oxides of silver or mercury have no effect upon it; concentrated sulphuric acid deprives it of water and separates the anhydrous crystals.

One of its most remarkable properties is the change it undergoes spontaneously when kept; it is altered into a porcelain-like mass called metachloral, which is insoluble, though isomeric with the liquid form. It can be reconverted into chloral by distillation. The white metachloral is insoluble in alcohol and ether, as well as in water, but by contact with water it is gradually converted into the crystallized hydrate of chloral.

Fuming nitric acid changes chloral into tri-chloracetic acid. An alcoholic solution of potash converts chloral immediately into formiate of potash and chloroform. This reaction may be represented as follows, $C^2Cl^3HO+KHO=KCHO^2+CHCl^3$. For pharmaceutical purposes chloral hydrate must form a hard, white, crystalline mass, be completely soluble in water, not smell of chloride of carbon or hydrochloric acid, but retain the peculiar, penetrating odor characteristic of chloral. It would be dangerous to employ hydrate of chloral, contaminated by chlorous acetylene, chloride of carbon and other incidental products, and hence great care must be observed in its preparation.

Much attention has recently been called to the hydrate of chloral in consequence of the physiological researches of Dr. Liebreich. This gentlemen, in presenting his paper to the Chemical Society of Berlin, May 24, 1869, gave the following interesting explanation of the occasion of his research:

"There are some substances which pass through the body without decomposition and without exercising any appreciable influence on the even tenor of our life; there are others which go to build up and nourish; others take up something from the body by chemical decomposition and then leave it; some are useful, such as acetic acid and sugar. I experimented recently to ascertain if, by the splitting up of certain compounds in the body, the separated compound would exert the same influence it would if administered alone.

"Trichloracetic acid of Dumas and chloral of Liebig appeared

to be the most favorable for experiment. It is known that these bodies when brought in contact with alkaline solutions split up into chloroform and formiates and carbonates of the alkalies. Both of these substances being soluble in water are easily absorbed; after they have passed into the circulation they come in contact with the alkali of the blood. My experiments proved that the formic acid and carbonic acid had no particular effect, while the chloroform exerted its full influence."

Dr. Liebreich reasoned that what took place outside of the body in the chemist's laboratory ought to follow in the alembic of the stomach; but he preferred to bring his agents directly in contact with the blood by subcutaneous injections rather than wait for the action by the way of the stomach; although in some experiments he injected the compound into the stomach.

Some animals slept in ten minutes after the application, and continued in this state for eighteen hours with quiet pulse and respiration. One man slept for sixteen hours without bad effects. The length of the action is explained on the theory of the gradual elimination of chloroform in the body, and its continuous effect upon the patient until the whole of it was decomposed.

Dr. Jacobi, a distinguished physician of New York, has repeated many of Dr. Liebreich's experiments with great success, and he recently read a very interesting paper on the subject before the New York County Medical Society, giving a detailed account of what he had done. On the other side of the question we find in the *Medical Gazette*, of New York, so ably edited by Dr. A. L. Carroll, a translation of some experiments conducted by M. Demarquay and communicated to the Academy of France, from which the experimenter draws the following conclusions:

"1. Chloral has a well marked soporific effect upon debilitated and weak subjects.

"2. The duration of its action is in direct proportion to the weakness of the patient.

"3. The sleep provoked by it is generally calm, and is only disturbed in patients laboring under acute pains. This leads me to advise it in diseases where it is desired to procure sleep and muscular resolution.

"4. Finally, this agent may be given in quite large doses, as

it has not caused any accidents in the dose of from one to five grammes."

Dr. Demarquay thinks that the chloral is eliminated through the lungs, and states that the breath of the patient smells of it; he does not agree with the theory of Liebreich that it is split up into chloroform and formic acid in the blood, but admits that it is the most rapid of all soporifics.

Dr. Jules Worms arrives at the following conclusions after conducting a series of experiments with the hydrate of chloral.

1. Chloral dissolved in ten parts of water can be drank without any inconvenience to the amount of ten grammes.

2. The effect is felt with 1½ to 2 grammes, but there are some obstinate cases which require a dose of 2 or 3 grammes.

3. A calm sleep, often profound, during which there is no modification in the temperature, in the regularity of the pulse or of the respiration, ensues in ten or fifteen minutes after the digestion of the chloral and continues for seven or eight hours. The waking is not accompanied by headache or nausea of any kind; there may be some dullness, but it is soon dissipated. It can be administered before or after meals, and exerts no influence upon digestion.

To sum up the experience of Dr. Worms, the hydrate of chloral appears to be an inoffensive agent in small doses, and may render important services as a hypnotic. In fact, the property which it possesses of determining sleep almost instantly is not possessed by any other agent that can be introduced internally. It possesses great advantage over opium and its derivatives in the rapidity of its action and the subsequent freedom from torpor and disagreeable sensations.

Trichloracetic acid was discovered by Dumas, in 1830, and was prepared by the action of chlorine on acetic acid. It crystallizes in octahedra and deliquesces in the air. As this acid is decomposed by alkalies into carbonic acid and chloroform, Dr. Liebreich proposes to employ it as a substitute for chloral, but no account of his experiments is available to us at this present writing. If his reasoning were to hold good with this compound also it would go far to sustain his theory in reference to the splitting up of chloral and the local action of chloroform. The

whole subject is of great interest to physiologists and chemists, and may be the occasion of important discoveries.

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NOTE.—The principal literature may be found in the following original papers:

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| Liebig Ann. Chem. Pharm. | I, 189 |
| Staedeler, Ann. Chem. Pharm. | LXI, 101 |
| Dumas, An. de Chim. Phys. | LVI, 123 |
| Regnault, An. de Chim. Phys. | LXXI, 409 |
| Wurtz., An. de Chim. Phys. | XLIX, 58 |
| Kolbe, Ann. Chem. Pharm. | CVI, 144 |
| Kopp, Ann. Chem. Pharm. | XCIV, 257 |
| Kopp, Ann. Chem. Pharm. | XCV, 307 |

Medical Gazette, New York, November 6th, 1869; page 267. —*New York Jour. of Applied Pharm., Dec.* 1869.

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## ARSENIC IN THE SODA OF COMMERCE.

Dr. Fresenius calls attention to a fact, accidentally discovered by him, that the carbonate of soda (neutral), as met with in a crystalised state, and as manufactured at the alkali works, now often contains a very perceptible quantity of arseniate, or arsenite of soda, undoubtedly due to the use of sulphuric acid for converting the common salt into sulphate of soda, which acid contains arsenic, derived from the pyrites, of which few are quite free from arsenic, and some of which contain that substance in considerable quantity. The tests applied for the detection of this arsenic were not the most delicate in use for this purpose; and the quantity found, though small, is sufficient to affect the purity of preparations for medicinal and chemical use.—*Chemical News, Nov.* 5, 1869.

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## TESTING ANTIMONY FOR ARSENIC BY THE MOIST WAY.

BY M. RUMP.

The author states: During the latter end of last year, on the occasion of the inspection of apothecaries' shops in Prussia, a quantity of tartar emetic was found to contain arsenic; as a

consequence thereof, a report was made to headquarters, at Berlin, and a rigorous inquiry and investigation set on foot by order of Dr. de Mühler, as minister for medical affairs and police (*medizinal polizei*). The methods of testing for arsenic, when mixed up with antimonial preparations, were carefully considered, and the following method of testing, due to the researches of Mine Inspector Strohmeyer, adopted: 2 grms. of the suspected tartar emetic are reduced to a fine powder and dissolved in 4 grms. of pure hydrochloric acid (sp. gr., 1·124). The glass vessel wherein this solution is made ought to be narrow, and capable of being well closed, and of sufficient size to contain an additional quantity of at least 30 grms. more of hydrochloric acid. A quantity of pure hydrochloric acid should be thoroughly saturated with sulphuretted hydrogen gas, and of this acid a quantity of at least 30 grms. is added to the solution of the tartar emetic. The glass vessel containing the solution is well corked, and, after having been shaken up, set aside; the turbidity which at first appears soon subsides (if it does not do so, it is due to the too great saturation of the HCl with HS, and should be remedied by the addition of some pure HCl). If no arsenic is present at all, the liquid remains perfectly colorless; but the slightest trace of arsenic gives rise to a yellow coloration, and very soon after to a perfectly perceptible pure yellow precipitate of sulphuret of arsenic.—*Chemical News, Dec.* 3, 1869.

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## ACTION OF DIRECT SUNLIGHT UPON IODIDE OF POTASSIUM.

By M. Loew.

A solution of iodide of potassium is, even when kept in well-closed bottles, slowly decomposed by the action of daylight, and assumes a somewhat yellowish tinge, due to free iodine. The author filled a number of glass tubes for about from one-half to three-fourths of their capacity, with a solution of iodide of potassium, and, after having sealed these tubes, exposed them to direct sunlight. Another set of tubes were likewise filled with the same solution, but all air was expelled, and the tubes sealed

during and after the solution had been boiling for a considerable time. These tubes were also exposed to the action of direct sunlight; after three and four months' exposure, the tubes and contents were examined; those wherein no air at all was left were found to be perfectly colorless, no decomposition of the contents having taken place. As regards the other tubes, the following results are noticed: 1. Under the influence of light, the oxygen of the air decomposes iodide of potassium, iodine in small quantity is set free, while hydrate of potassa is found in the liquid. 2. This decomposition is limited, and does not, even when a large quantity of oxygen is present, increase, because a portion of the iodine set free enters again into combination with the caustic potassa set free, forming iodide of potassium and iodate of potassa. 3. The testing for ozone by means of a solution of iodide of potassium and starch (or paper prepared therewith), is of no value whatever, unless care has been taken to exclude direct sunlight.—*Chemical News, Dec.* 3, 1869.

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# Editorial Department.

Our Journal.—Forty-second Volume.—In commencing a new volume it is usual with many editors to offer some remarks apposite to the work in their charge. It is not often that we have taken advantage of this practice, but the present seems to offer a fitting occasion. Our readers will find an unusual amount of original matter in the present issue; in fact nearly the whole of it is the work of our contributors. Attention is particularly called to the valuable paper of Dr. Wormley, whose well known and extensive labors in toxicological chemistry cause this contribution to be highly appreciated. The view of Pharmacy in Sweden opened by Mr. Oldberg will gratify many by its plain, free style, and his feeling acquaintance with the subject. Swedish Pharmacy has been a nursery of great men in science; Scheele, the father of Organic Chemistry, passed through the routine described. Our friend Dr. Squibb treats us to one of his old-fashioned exhaustive articles on the preparation and titration of opium, as exhibited in his "Liquor Opii Compositus." He has substituted the disagreeable Hoffman's anodyne by chloroform and acetic ether, for reasons which he gives at length. Mr. Campbell gives a more explicit statement of his "method" of applying percolation in the preparation of fluid extracts. The evident interest excited by his former paper, published in our September issue, has not abated, as will be seen by com-

mentaries in this, an interest arising from the real importance of having our Pharmacopœia processes so manageable that they can be performed easily within the shop laboratory. We have not yet satisfied ourself of the actual necessity and value of making glycerin enter so generally into these preparations, nor do we yet appreciate whether its presence may be viewed as so much sugar, or whether it has certain physiological properties when administered that render its presence sometimes inappropriate. This is a point that medical observers would do well to determine.

Whilst on this subject we will take occasion to say that there are quite a number of our subscribers whose practice conveys the impression that printers and paper makers work gratuitously. There are some who owe us for eight and ten years of subscriptions, and yet expect to receive this number as though of right. This situation, it may be said, is our fault in sending. This may be true, but the course of our College in this, as in most others of its functions, has been rather to extend knowledge than to make money, depending on the just appreciation of its efforts in the long run to benefit Pharmacy. If some of this class of our patrons fail to receive this volume, they must attribute it to an earnest effort to reduce our expenses, rather than to a disposition to deprive them of their customary reading matter, and that, appreciating our sincerity, they will manfully pay up old scores, and bring smiles to the visage of our treasurer.

We will also take occasion to ask the attention of our subscribers to the mail service of their localities. Where several subscribers are at one place, our mailing clerk always, after writing the names on the covers, ties them together in paper directed to the postmaster. It frequently happens, under these circumstances, that, while nearly all receive the Journal, one will write of its failure, when, as a matter of course, the missing journal must have reached the post office. It is therefore the duty of subscribers to promptly investigate these failures to receive, because when we carefully mail them our responsibility ends. When subscribers move their residence from one post district to another they often forget to notify us, and thus occasion loss and trouble. In sending their address, each subscriber in small towns should specify his County as well as State, to give additional safety.

We owe an apology to our subscribers for the late appearance of this number, due partly from the necessity of waiting for the illustration at first page, which has not yet come to hand on Jan. 5th. Quite a number of excellent papers in our exchanges are waiting for notice or reprinting in our pages, and it is hoped that we will be able in the March number to do them justice.

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JOINT ACTION OF MEDICAL AND PHARMACEUTICAL COMMITTEES IN RELATION TO A DRUG LAW.—In March last the County Medical Society appointed a committee, consisting of Doctors Gross, Burns, Stetler, Gebhard and Hamilton, to take some action in reference to the necessity of a law against

the adulteration of drugs, etc. This committee having invited the Philadelphia College of Pharmacy to appoint a similar committee to co-operate in the same object, that body responded by the appointment of Messrs. Procter, Parrish, Maisch, Taylor and Bullock. The joint committee on their first meeting determined to invite the College of Physicians of Philadelphia to take part in the work, which being acceded to, that College appointed Doctors Carson, Ruschenberger, Ashurst, E. Hartshorne and T. H. Bache. Subsequently, at the meeting of the State Medical Society, that body also appointed a committee, consisting of Doctors Nebinger, Mayburry, Cummisky, Knight and W. L. Wells.

This joint committee have met from time to time, and have discussed the business referred to them, more especially in relation to the necessity of a law to restrain and punish drug adulteration, and of an inspector to see it carried into effect. The pharmaceutists, having been invited by the physicians, desired to know on what grounds their medical friends founded the necessity for such a law, and, on hearing the statements upon which it was based, took the ground that as regarded foreign *drugs* no such necessity existed, the government inspection at the ports of entry having to a large extent excluded the low grade of drugs formerly imported. In regard to the alleged deviations from the Pharmacopœia in making standard medicines by apothecaries, druggists, and manufacturing pharmaceutists, it was admitted that such deviations did exist, and that want of uniformity was a great evil, arising from various causes, but chiefly from the attempts of manufacturers to produce these preparations by processes and formulæ less expensive than those of the National Code. They believed that the first duty of physicians and apothecaries was to make the National Code a true exposition of the present state of the pharmaceutic art, and in its materia medica to accord with the demands of the medical profession in all parts of the country. Then to insist on its recognition by physicians, pharmaceutists and druggists. They did not think an inspector of drugs and medicines could possibly meet the difficulty, as, independent of the impossibility of analysing Galenical medicines successfully, it would involve so much time as to require an hundred inspectors for the State to carry out the law. They (the pharmaceutists) therefore advocated measures tending to raise the status of pharmacy, and to confine its practice to qualified persons, by urging a law based on qualification sustained by registration. They also were willing to have a law making the adulteration of drugs and medicines a misdemeanor, provided it was to be carried out by the Courts through the aid of qualified and recognized experts, and not by the mere *ipse dixit* of informers, medical and otherwise.

The physicians of the joint committee, except in a very few instances, were not prepared to sustain the grave charges which a committee of the State Medical Society had made last winter to the Legislature, on the occasion of memorializing that body for a law with an inspectorship; and,

after much discussion, it was finally agreed by the joint committee to recommend so much of the draft of a law suggested by the American Pharmaceutical Association in September last, at Chicago, as pertained to the adulteration of drugs. This came up for consideration at the meeting of Dec. 18th, at which too few were present to give force to the expression, and its consideration was postponed till Dec. 29th, when the following resolutions were passed, with a majority present, the first with one negative vote, the second unanimously:

"*Resolved*, That the Joint Committee appointed by the College of Physicians, the State Medical Society, the County Medical Society, and the College of Pharmacy, respectfully advise the several bodies which they represent that, in their opinion, the draft of a law proposed and considered by the American Pharmaceutical Association embodies a better plan than any other which has been brought to their notice, for the suppression of adulteration and sophistication of drugs and medicines."

"*Resolved*, That the expression of opinion of the Joint Committee, in the resolution just adopted, refers exclusively to those sections of the 'Draft of a proposed Law' which relate to the adulteration and sophistication of drugs and medicines."

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CORRECTION.—NEW YORK COLLEGE OF PHARMACY.—In a paper on "Pharmacy in the United States," by Mr. John Faber, published in the September number of the American Journal of Pharmacy, page 399, the following paragraphs occur, relating to a law previously stated to exist in the State of New York:

By force of that law, the College of Pharmacy in New York, in the year of 1830, after having repeatedly fined, caused a number of establishments (the owners of which could not prove their legal qualification) to be closed. But they appealed to the Supreme Court of the United States, which declared this law unconstitutional, it being not in accordance with the general freedom of trade, as sanctioned by the Constitution of the United States.

On the strength of that decision, those that were thus interrupted in their business commenced an action against the College of Pharmacy of New York, which had to pay such heavy damages, that it took that institution over fifteen years to recover from it.

A letter received from Mr. George C. Close, President of the New York College of Pharmacy (and which should have been noticed in our last number), after saying that this whole statement is untrue, and that Mr. Faber has been misinformed, says:

"The first charter for the College was [granted] in 1831, and the act to regulate the preparation and dispensing of medicines in the city of New York was passed March 11th, 1839.

"The College of Pharmacy of New York never has taken any action towards enforcing this law, neither has any individual done so; and of course the appeal to the Supreme Court, and the subsequent action against the College, the fines, &c., had no existence except in the fertile brain of Mr. Faber's informant. The law of the State of New York referred to is defective, in directing the fines collected to be paid to an in-

stitution which has no existence under the title designated, and this perhaps is one reason that no attempt has been made to enforce it."

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UNIVERSITY OF MICHIGAN.—The following letter was alluded to in our last number, but was received too late to afford space for it:

MICHIGAN UNIVERSITY, Sept. 24, 1869.

EDITOR AMERICAN JOURNAL OF PHARMACY:

*Dear Sir*,—Your September number contains a list of the graduates from the Michigan University School of Pharmacy, prefaced by some editorial comments. You say you "are not well assured of the preliminary requirements of this school as regards practical training in the shop, and hence do not know the real value of the diploma granted." Perhaps some explanation upon this point may be in order.

No requirement of training in the shop is made, either for admission to the course or for graduation. Our school believes it to be quite as well for the young pharmacist, better for his employer, and far better for the public, that scientific preparation for the drug business should *precede* experience in it. Some students enter our course after several years of shop experience; in consequence they have the advantage, in the college, of greater eagerness. Others graduate to engage for the first in the drug store; they have thereby the advantage, in their vocation, of a more enlightened experience. The course now established here embraces training, under supervision, at the prescription stand,—actual work, certainly as well deserving the credit of responsible experience for the pharmaceutical student as hospital practice does for the medical student. This training is valued as a means of binding principle to practice, but it is not allowed to take the place of more fundamental education. Our classes are assured that it is not our design to enable them, in the least possible time, to enter upon drug dispensing, but to prepare them for more responsible positions during life. It is our endeavor to educate scientific experts,—competent for drug assays, familiar with the toxical properties of medicines, habituated to accuracy, capable of professional truthfulness and earnest to maintain it,—not mere ready tradesmen in pharmacy, but such as shall be *worthy* of the often abused designation of pharmaceutical chemist. The facility in detail acquired during years of activity in a drug store has its value,—one in no danger of depreciation. Certificates of shop experience can be obtained, by good behaviour and old Father Time, upon sufficient authority without resort to the College.

"In this country the words Pharmaceutical Chemist have no meaning beyond the other terms used to express the business or profession of a pharmaceutist." In the definitions of American dictionaries, apothecaries, pharmaceutists and druggists are those *engaged* in preparing, selling, buying drugs, while a pharmaceutical chemist is (constructively) "one *versed* in chemistry," "pertaining to preparing medicines," &c. Certainly druggists do style themselves pharmaceutical chemists if they choose, without regard to scientific education. And any man whose occupation

it is to devise and direct the building of bridges, aqueducts, &c., is a civil engineer, both by custom and the dictionary; but this fact does not lessen the significance of the College diploma of Civil Engineer. This School gives the diploma of Pharmaceutical Chemist, because, of customary terms, these best express the educational design of this School. The meaning of the diploma will depend, of course, upon the worth of the education. In choice of title we had no precedent; for our methods of study, and requirements, differ from those elsewhere preceding pharmacy graduation.

With a full appreciation of the invaluable work which has been done with young men engaged in the drug business by the Colleges of Pharmacy of the United States (would there were more of them!), it appears to us that something should *also* be done in the "Universities" of our country to educate for an avocation that must be scientific to be useful. Agriculture, Mechanics, Engineering, Mining, and almost every responsible occupation, whether mainly mental or manual, have their courses of liberal instruction laid out in our institutions of learning; courses embracing years of discipline in science, absorbing the entire time and energy of the student, and designed to precede business experience. We labor toward placing pharmacy in scientific hands; who welcomes our effort?

A. B. Prescott, M.D.

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Is Glycerin and Saw Dust Spontaneously Combustible?—The following letter from our friend Brown is worthy of a little thought. Our own experience furnishes no solution to the phenomenon, assuming the case to be, as the relator supposes, a mere mixture of glycerin and sawdust. Under these circumstances, by capillary attraction the glycerin would be extended over an immense surface of ligneous cell structure, presenting a large surface to the air in contact. Whether oxidation, resulting in visible combustion, takes place under these conditions, is the question. Can any of our readers throw light on it, yea or nay, or must the ignition be due to a match or other cause accidentally present?

Leavenworth, Kansas, Nov. 27, 1869.

Dear Sir.—I wish to relate to you the following circumstance, that occurred in this city, and, as it seems to be a mystery to us, it may not be to you. A druggist here purchased from W. J. M. Gorden a box containing a number of lb. bottles of glycerin, packed in saw dust. Upon opening the box he found several of the bottles broken. After taking out all the perfect bottles, he put back the saw dust and nailed the box up, and placed it aside in his store. It remained there a day or two, when he discovered the box to be smoking, and upon opening it burst out in a flame and burned rapidly. He carried the box out in the street, and by the aid of water the fire was put out.

Query. What produced spontaneous combustion? A letter from Mr. Gorden states that it was packed in saw dust from the mill, and he never had heard of a similar case before. Would packing in damp saw dust, and fermentation going on, produce it?

Yours, truly, R. J. Brown.

*Pharmacopœa Suecica. Editio Septima.* Stockholmiæ, 1869. P. A. Norstedt & Filii, Typog. Reg.; p. 275, 12mo.

Through the kind offices of Oscar Oldberg, of Washington, D. C., we have received a copy of this volume. It is in the Latin language; the Materia Medica and the preparations are arranged together alphabetically, as in the last British Pharmacopœia. The French metrical weights are adopted, the *gramme* being considered equal to 0.0023525 of the Swedish pound, which is equivalent to 425·0758 grammes. No measures of capacity are adopted; *all liquids are ordered by weight, and it is forbidden to dispense them by measure. The metre* is adopted as the measure of length, divided into the decimetre and centimetre. Temperature is measured by the centigrade scale, and by this scale the range for *maceration* is between 15° and 25°, and for *digestion* between 35° and 45°.

The nomenclature differs much from the simplicity of ours. In specifying salts the acid is mentioned first, as Acetas Morphicus, Hyposulphis Natricus, Iodetum Hydrargyrosum, Sulphas Chinicus. The parts of plants are expressed in the name, as Bulbus Allii, Cortex Chinæ Calisaya, Flavedo Aurantii, Flores Caryophylli, Folia Sennæ, Fructus Anisi, Glandula Lupuli, Herba Lobeliæ, Radix Arnicæ, Ramuli Sabinæ, Rhizoma Zingiberis, Semina Myristicæ, Stigmata Croci, Stipites Dulcamara, Tubera Jalapæ, Gummi Resina Asa Fœtidæ. Any liquid oleo-resin is called a balsam, whilst Benzoin is called Resina Benzoe. Opium in all preparations is indicated by an adjective derived from the word thebaiacum, thus—Tinctura Thebaica, Trochisci Glycyrrhizæ Thebaici, Vinum Thebaicum Crocatum, Pulvis Ipecacuanhæ Thebaicus, Acetum Thebaicum. Solutions are indicated by the prefix Solutio instead of Liquor. Volatile oils are Ætherolea. Under the name Nitras Argenticus Mitigatus a fused mixture of equal parts of nitrate of silver and nitrate of potassa is indicated, whilst Nitras Argenticus Bis Mitigatus contains two parts of the potassa salt. Tartar emetic is Tartras Stibico Kalicus.

The formulæ appear to be gotten up in a careful and practical manner, and so far as examined are judicious and closely allied in many instances to our own; yet there are many peculiarities, some of which are noticed here, viz.: Ammoniac plaster is made from one part of ammoniac and two parts of vinegar of squills. Electuary of senna consists of powdered coriander 1, powd. senna 10, pulp of tamarind 15, syrup 25. There is a class of extracts made into powder with liquorice root, thus: Take of the extract and liquorice powder equal parts, mix intimately, and dry on a porcelain plate between 40° and 50° Cent., then add sufficient liquorice powder to restore the weight lost by drying, and triturate to a fine powder. This form is very convenient in prescribing powders, is uniform in strength—two grains representing one of the normal extract. The pulverized extracts of aconite root, belladonna, cannabis, conium, digitalis and hyoscyamus are thus prepared.

Under the head of Pulveres Simplices are some general observations in relation to the powders of simple drugs. These are divided into four classes: 1st. Those which pass through a silk sieve of 40 meshes to the centimetre (=100 per inch), of which there are two kinds: A, those powdered without residue, as aloes, cinchona, gamboge, rhubarb, &c., and B, those powdered with a residue, as digitalis, hyoscyamus, senna and ipecac.

The second class pass a sieve 32 meshes to the centimetre (72 per inch). The third class through a sieve 18 meshes to the centimetre (45 per inch). The fourth class are made with a wire sieve, 10 meshes to the centimetre, or 25 per inch, such as flax seed and black mustard,

There are about 19 syrups, among which is the following singular formula for syrup of squills, which we quote verbatim as a sample of the text, viz.:

"Syrupus Scilliticus (sjölök syrup).

Rec. Rhizomatis Zingiberis *partem unam* 1
Bulbi Scillæ *partes duas* 2
Herbæ Hyssopi *partes quatuor* 4

Contusa et concisa in vase clauso per diem noctemque macerantur cum
Aquæ Menthæ piperitæ tanta copia
ut liquor exprimendo colatus et filtratus pondus habeat
*partium triginta quinque* 35
quæ cum
Sacchari Albi *partibus tribus et sexaginta* 63
Calore leni adhibito in syrupum convertantur."

This formula also serves to show the plan of bringing forward the ingredients in a formula as the manipulation requires them.

The only *modus operandi* for tinctures is maceration for five days in a close vessel, with occasional agitation, followed by expression and filtration. The method of percolation as understood here is not mentioned in the work.

Among the ointments Unguentum Cetacei has the synonym of "Cold Cream," and is prepared thus: 4 parts of white wax, 5 of spermaceti, and 28 of oil of almonds, are liquified by a gentle heat, and agitated in a warm mortar with 12 parts of rose water, until cool. 4 parts more of almond oil are then added, and the mixture beaten to a soft very white ointment.

Unguentum Glycerini is Schacht's glycamyl, made by heating 2 parts of starch, 1 of water, and 10 of glycerin until the mixture becomes translucent.

A peculiarity of this Pharmacopœia, also noticed in some German codes, are tables relative to the doses of medicines and poisons.

Table A exhibits the maximum dose, for an adult, of powerful medicines.

Table B exhibits medicines which are not to be dispensed except on the prescription of a physician or by permission of the proprietor, and which are kept in locked closets.

Table C indicates medicines which are not to be dispensed except by prescription or permission, and which are kept separate.

Table D enumerates the medicines which are not required to be kept unless previously prescribed by a physician.

The names of all poisons are written with a sign, to indicate their nature.

Some of these tables are worthy of adoption here, and the whole work shows a care and precision in details regarding poisons that must go far to prevent accidents in Sweden.

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*Annual Report of the Board of Regents of the Smithsonian Institution*, showing the operations, expenditures, and condition of the Institution for the year 1868. Washington: Government Printing Office, 1869; pp. 473, octavo.

The policy of the Smithsonian Institution has greatly changed within a few years past, and from being destined to become a vast accumulation of books, and a museum of scientific objects and natural history collections, requiring all its income to keep them in order, now seems likely to carry out the design of its founder, by using its income to increase and diffuse knowledge in accordance with the views of Prof. Henry and some others. The original bequest was $541,379.63, which, by careful management of the interest, is now a capital of $697,000, giving an income of $40,820.

The Library of the Institution was last year incorporated with that of Congress, in the Capitol. During the present year the herbarium, embracing between 15,000 and 20,000 specimens, has been transferred to the care of the Department of Agriculture. This collection, on which Professors Torrey and Gray have spent much time, it is to be hoped will be properly cared for and increased. The conditions of the transfer are that the botanist in charge shall be approved by the Institution, that it shall be accessible to the public for practical or educational purposes, and to the Institution for scientific investigation or for supplying information to correspondents.

A recent arrangement with the Surgeon General transfers the large collection of human crania belonging to the Institution to the museum under his charge, whilst it receives in return the ethnological collection of the medical museum.

The collections of type specimens of insects belonging to the Institution have been placed in the hands of entomologists for arrangement and study, to be reclaimed when required; thus carrying out the same line of policy above alluded to.

The general appendix, comprising four-fifths of the book, includes Flouren's memoir of Cuvier, trans lated by C. A. Alexander; Elie de Beaumont's memoir of Oersted, translated by the same; Hagen's memoir of Encke, and Rawson's memoir of Eaton Hodgkinson. Besides these, recent information in relation to the mechanical theory of heat, radiation,

meteorites, etc., etc., and the proceedings of various Societies, the publication of which is in accord with the object of the Smithsonian Institution as a disseminator of knowledge.

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*Proceedings of the British Pharmaceutical Conference at the Sixth Annual Conference, at Exeter*, 1869. London; pp. 87, 8vo.

The publication, almost entire, of these proceedings in the Pharmaceutical Journal of London, has enabled us to anticipate the reception of this volume in our notice of the meeting, at page 571 of the November number. The list of members and general index to the proceedings heretofore published, from 1864 inclusive, with title-page for a general volume, are valuable additions to the matter published before. Several papers of great interest we hope to introduce into this volume, (which have been excluded by the large amount of original matter presented), especially that of Mr. Schacht, which offers views in relation to pharmaceutical education well worthy of attention this side the Atlantic. Mr. Stoddart's application of spectral analysis to pharmacy in recognizing Galenical preparations, opens up a new method of recognition, the value of which deserves study, however little apparent promise it may offer at the outset. We have always deemed these meetings of the highest value in stimulating British pharmaceutists to increased efforts, and in raising the ideas of "provincial" members to a level with those of their more favored brethren of the Metropolis, so that they may appreciate the intentions of the late Act of Parliament as an agency to elevate and educate all who practice Pharmacy.

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*Journal of a Botanical Excursion in the North Eastern parts of the States of Pennsylvania and New York during the year* 1807. By Frederick Pursh. Philadelphia, 1869; 87 pages, 12mo.

The manuscript of this little volume belongs to the American Philosophical Society, who received it from the executors of the late Dr. Benj. S. Barton, with other papers, but without the name of the author. Mr. Thos. P. James, when acting librarian of the Society, noticed the MS., and, aided by the suggestions of a friend, succeeded in identifying it as the journal of Pursh. The excursionist was aided by Dr. Barton with funds, and his journal is written in a peculiar quaint style, indicating an imperfect acquaintance with English. The editor has rendered it literally, that none of its interest may be lost. The name of Pursh is well known in connection with the Botany of the United States, and this account of one of his journeys in developing the flora of this country will be valued by all who take an interest in Botany and its cultivators.

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*Report and Remarks on a Third Series of* 100 *cases of Cataract Extraction by the Peripheric-Linear Method.* By H. Knapp, M.D., &c., &c. New York: William Wood & Co., 1869; pp. 29, octavo.

*A Contribution to the Physiological Study of Veratrum Viride and Veratria*, (with Experiments on Lower Animals, made at La Grange Laboratory, 1869). By R. Armory, M. D., and S. G. Webber, M. D. Reprinted from the Boston Medical and Surgical Journal. Boston, 1869; pp. 66, 12mo.

The authors start out with the statement that "Veratrum Viride was not brought into notice until a little more than two years ago," which is strange when it is recollected that Dr. Tully and others had written of it, not to speak of the great advertising its properties received through the exertions of Dr. Norwood, of South Carolina, some dozen or more years ago, who claimed for it unequalled sedative powers. They also appear to be wholly unacquainted with the investigations published in the volumes of this Journal for 1865–66, showing the existence of *two* alkaloids in Veratrum Viride, and evidence that neither of them is Veratria. The authors do not state whether they used *pure* Veratria or the mixed alkaloids of commerce sold under the name. Some of the physiological experiments appear to have been loosely performed.

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*A Pharmacopœia, including the outlines of Materia Medica and Therapeutics*; for the use of practitioners and students of veterinary medicine. By Richard V. Tuson, F.C.S., Prof. of Chem. and Mat. Med. at the Royal Veterinary College, &c. London: John Churchill & Sons, 1869; pp. 311, 12mo. From the publishers.

The reader on opening this work might readily imagine it the British Pharmacopœia, until he came to some classes of preparations of special veterinary character. Judging from the men on whom a large portion of veterinary practice of this country devolves, we think this work is far too technical and scientific, however well it may be appreciated by the graduates of foreign veterinary schools. The nomenclature is in Latin, and is either that of the London Pharmacopœia or shaped on the same principle. The formulæ are often identical for preparation, but for such as enemas, bolus, etc., the quantities are increased to suit the greater demand of the animals treated. We see none of the outlandish mixtures so often heard of for dosing animals, and it would appear that modern European veterinary therapeutics approximates that applied in human practice.

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*Annual Report of the Surgeon General, U. S. Army*, 1869. Printed at the Surgeon General's Office; pp. 11, octavo.

This report of Surgeon General Barnes gives an account of the health of the army during the past year, and especially describes the occurrence of yellow fever at Key West, Florida, in June last, which on its discovery was greatly mitigated by the removal of a part of the troops, and the establishment of strict quarantine regulations. The disease is attributed to refugees from Cuba. Much credit is given to the medical officers in charge. The Army Medical Museum continues to be augmented, and

the Medical and Surgical History of the War is slowly but surely progressing. The solid and permanent manner in which these new features of the medical department of the army are being carried out is as creditable to the Medical Bureau as it is to the indefatigable exertions of the officers and surgeons in charge.

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*The Pathology of Bright's Disease.* By Wm. B. Lewis, M.D., &c., with illustrations. New York: Turner & Mignard, 1869.

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*Eulogium on Thomas C. Brinsmade, M.D.* Read before the Rennselaer County Medical Society. By Geo. C. Hubbard, M.D. Albany, 1869, &c.

From the Author.

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*Constitution, By-Laws, and Code of Ethics of the Philadelphia College of Pharmacy*, with lists of officers, committees, members and graduates, and the announcement of the School of Pharmacy. Pp. 56. 1869.

This pamphlet, the result of much labor during the past year, is sent to the members of the College with this number, and, as far as possible, to the associate, honorary, and corresponding members, and the subscribers. As several important changes have occurred in regard to membership, and a new class of foreign members created, it should be closely examined by all interested.

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## OBITUARY.

George Peabody.—This eminent patron of science and education died in London, November 4th, 1869, in his 75th year. A Massachusetts man by birth, and attached to his native soil, Mr. P. spent most of his life away from it, the earlier portion in Baltimore and the latter in London, where, chiefly as merchant, and afterwards as banker, he acquired the immense fortune, the judicious disposition of which, during his life, for educational and philanthropic purposes, has won for him the respect and admiration of the old world and the new. These gifts were scattered through a period of seventeen years, but it was only in the latter portion of his life that his enlarged views took shape, in regard to the London poor and to scientific and educational institutions in this country. Nations have vied to honor his memory.

Dr. Frederick Penny, Professor of Chemistry in the Andersonian Institution since 1839, died recently in Glasgow, Scotland. Numerous papers record his researches.

Peter V. Coppuck, of Mount Holly, N. J., died on the 29th of December, 1869, in the 64th year of his age. He was an apothecary in good repute in his locality, was an associate member of the Philadelphia College of Pharmacy, a member of the American Pharmaceutical Associa-

tion, and has been in business about 41 years. He was a useful and public spirited citizen and much respected in the community where he resided.

Pierre-François-Guillaume Boullay, Dean of the Imperial Academy of Medicine, Honorary President of the Society of Pharmacy of Paris, and one of the founders of the Journal de Pharmacie, died at Paris in about the first of November last, aged 92 years. According to M. Buignet, from whose address we draw most of the following facts, M. Boullay was born at Caen, of an honorable protestant family, and commenced his education at the College there, but his studies were interrupted by the revolution. He commenced his career as pharmacien with M. Mezaize, at Rouen, then with M. Bacoffe, of Paris, and entered the laboratory Vauquelin through the recommendation of Valmont, Bomare and other savants, where he availed himself largely of the advantages his position under this great master afforded, and at the age of twenty gained the first prize in chemistry. He founded a pharmacy in Paris, in 1798, which became a noted center, and in 1803 became a member of the Societié de Pharmacie. In 1809, in company with MM. Boudet, Planche, Cadet and Destouches, he founded the Bulletin de Pharmacie, which, in 1815, became the *Journal de Pharmacie*, which has continued to the present time. Various of his researches mark the pages of this great serial. He was the discoverer of picrotoxin, and in connection with his son, the late Polydore Boullay, developed and applied the *methode de displacement* to pharmacy. This, more than any other of his labors demands the regard of Americans, as here more than anywhere else has this valuable process been applied in pharmaceutical manipulation. In 1820 he became a member of the Académie de Médicine, and was the last of its founders.

As a Pharmacien M. Boullay was noted for conscientiousnes and probity. He did not accept the responsibility of a medicine unless he prepared it himself. His laboratory was always busy, and became a school in which many eminent pharmaciens commenced their career. M. Boullay was a member of many learned societies, and last year was elected an honorary member of the Philadelphia College of Pharmacy, as he had previously been of the American Pharmaceutical Association.

On the preliminary organization of the International Pharmaceutical Congress, held at Paris, in August, 1867, M. Boullay was elected temporary president, and his venerable appearance, then in his 90th year, graced that honorable position.

The character of M. Boullay was full of dignity and greatness of soul, and though jealous of the prerogatives due to his age and long experience, his urbanity was carried in all his relations, and caused the general esteem of those who knew him.

# Catalogue of the Class of the Philadelphia College of Pharmacy,

## FOR THE FOR Y-NINTH SESSION, 1869–70.

*With a List of their Preceptors and Localities.*

| MATRICULANTS. | TOWN OR COUNTY. | STATE. | PRECEPTOR. |
|---|---|---|---|
| Adams, L. W. | Philadelphia, | Pennsylvania, | W. B. Thompson. |
| Albrecht, E. | " | " | C. E. Hænchen. |
| Allen, C. Sumner, | Cleveland, | Ohio, | Arthur Mosely. |
| Ash, Franklin J. | Philadelphia, | Pennsylvania, | S. Mason McCollin. |
| Barton, George W. | " | " | J. R. Augney, M.D. |
| Beatty, Henry J. | Harrisburg, | " | W. H. Egle & Co. |
| Beeler, John L. | Hamilton, | Ohio, | |
| Bille, George, | Philadelphia, | Pennsylvania, | C. A. Werkshagen. |
| Bitler, Henry H. | " | " | Buchanan, Bean & Stevens'n |
| Bolton, C. F. | " | " | Jos. P. Bolton. |
| Borton, George D. | " | " | Benjamin J. Crew. |
| Bolger, J. C. | Martinsburg, | " | A. H. Yarnall & Co. |
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| Brennan, John M. | Philadelphia, | " | Geo. C. Evans. |
| Briggs, Milton G. | Norristown, | " | James G. Wells. |
| Bringhurst, Jn. H. | Philadelphia, | " | Caleb R. Keeney. |
| Brinton, C. Hill, | West Chester, | " | John Wyeth & Bro. |
| Buck, Charles P. | Lebanon, | " | Robert England. |
| Burroughs, Silas M. | Buffalo, | New York, | O. H. P. Champlin. |
| Bush, Edward, | Philadelphia, | Pennsylvania, | Baker, Moore & Mein. |
| Byers, R. E. | Belle Vernon, | " | R. C. Byers. |
| Byers, W. C. | " | " | R. C. Byers. |
| Camm, Harry V. | Bridgeton, | New Jersey, | John L. Curvy. |
| Carter, J. M. S. | Waco, | Texas, | J. E. Sears. |
| Causse, Emiliano. | St. Iago, | Cuba, | |
| Chiles, Edward, | Frankfort, | Kentucky, | Charles Shivers. |
| Clarke, S. B. M. | | Vermont, | C. Clarke, M.D. |
| Clemson, F. C. F. | Philadelphia, | Pennsylvania, | P. Niskey. |
| Clothier, Samuel, | " | " | Mellor & Rittenhouse. |
| Conard, T. E. | " | " | James T. Shinn. |
| Connally, W. C. | Atlanta, | Georgia, | Jas. S. Robinson. |
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| D'Invilliers, Charles, | " | " | C. Ellis, Son & Co. |
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| Duffield, Harrison, | Philadelphia, | " | John Moffet. |
| Dugan, W. F. | " | " | Joseph J. Dugan. |
| Eberhard, Oliver, | " | " | S. Rosenberger, M.D. |
| Ehler, W. R. | Lancaster, | " | |
| Eldridge, Jerome, | Haddonville, | New Jersey, | A. W. Wright, M.D. |
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| Fow, Oscar A. | Philadelphia, | Pennsylvania, | |
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| Gerhard, A. F. | " | " | E. Gaillard. |
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| Gould, C. M. | Lake City, | Minnesota, | Thomas Gibbs. |
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| Gramm, E. C. | Philadelphia, | Pennsylvania, | E. D. Chipman. |
| Groff, C. L. | " | " | S. Gerhard, |
| Guy, G. Omar, | Chicago, | Illinois, | J. Kenworthy. |

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| Hannaman, J. B. | " | " | R. Keys. |
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| Smith, Henry, | " | " | Geo. D. Blomer. |
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| Tomassevich, L. | St. Jago, | Cuba, | A. B. Taylor. |
| Tull, John, | Philadelphia, | Pennsylvania, | J. Graham, Tull & Son. |
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| Vernon, George R. | Media, | " | A. M. Burden, M.D. |
| Wallace, W. H. | Philadelphia, | " | Jas. Anderson, M.D. |
| Watson, Wm. C. | " | " | John Bley. |
| Weaver, John A. | Easton, | " | E. B. Garrigues. |
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| Weidler, Samuel W. | Lancaster, | Pennsylvania, | J. A. Heintzelman. |
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| Wetherill, Albert, | Philadelphia, | " | Wetherill & Bro. |
| Wetherill, Frank D. | " | " | Wetherill & Bro. |
| Wetherill, Henry M. | " | " | Wetherill & Bro. |
| Wiegner, James A. | Nazareth, | " | Philip Horn. |
| Wilhelm, J. Alex. | York, | " | Isaac H. Kay. |
| Willard, R., Jr. | Haddonfield, | New Jersey, | Isaac A. Braddock. |
| Williamson, J. L. | Bethlehem, | Pennsylvania, | C. R. Keeney. |
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| Wright, Samuel P. | Smyrna, | " | Wm. Procter, Jr. |
| Young, John, | Philadelphia, | Pennsylvania, | J. P. Milner. |

# CONSTITUTION,

## BY-LAWS AND CODE OF ETHICS

OF THE

# PHILADELPHIA COLLEGE OF PHARMACY,

WITH LISTS OF

## OFFICERS, COMMITTEES,

## MEMBERS AND GRADUATES,

AND THE

## Announcement of the School of Pharmacy.

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PHILADELPHIA:
MERRIHEW & SON, PRINTERS,
243 Arch Street.
1869.

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DILLWYN PARRISH.

VICE-PRESIDENTS,

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RECORDING SECRETARY,

CHARLES BULLOCK.

CORRESPONDING SECRETARY,

ALFRED B. TAYLOR.

TREASURER,

AMBROSE SMITH.

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PUBLICATION COMMITTEE,

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COMMITTEE ON DECEASED MEMBERS,

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WILLIAM PROCTER, JR.,
CHARLES BULLOCK.

# CHARTER.

## AN ACT TO INCORPORATE THE PHILADELPHIA COLLEGE OF PHARMACY.

WHEREAS, to dispense and prepare drugs and medicines for the use of the sick requires knowledge and skill of a peculiar kind, an ignorance of which opens the door to numerous abuses and evils, and is pregnant with serious consequences to health and life; and it being the duty of every good government to protect, as far as in it lies, its citizens from those ills and dangers to which they become exposed in the multiplied relations of society, by promoting and encouraging wholesome institutions and regulations, calculated to advance the well-being, security and interests of the community; and it being represented to the Legislature that an institution has been established in the city of Philadelphia called "The Philadelphia College of Apothecaries," for the purpose of cultivating, improving, and making known a knowledge of Pharmacy, its collateral branches of science, and the best modes of preparing medicines and their compounds, and of giving instruction in the same by public lectures:

Now, that the purpose thereof may be the better carried into effect:

SECT. 1. Be it enacted, by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in general assembly met, and it is hereby enacted by authority of the same, That all such persons as now are members of the Philadelphia College of Apothecaries, or may hereafter become members of the same, be, and they are hereby made and constituted a corporation and body politic, in law and in fact, to have continuance forever, by the name, style and title of the PHILADELPHIA COL-

LEGE OF PHARMACY, with power to make one public and common seal, and also one private seal to use in their affairs, and the same or either of them to change at pleasure; to make contracts relative to said institution, to sue and be sued, and by that name and style to be capable, in law, of purchasing, taking, holding, and conveying any estate, real or personal, for the use of said corporation: Provided, that the annual income of such estate shall not exceed in value five thousand dollars, nor be applied to any other purposes than those for which this corporation is formed.

SECT. 2. And be it further enacted, by the authority aforesaid, That the said College may establish By-Laws and Rules for its government and regulation, and for the preservation and application of the funds thereof, not repugnant to the Constitution and Laws of the United States or of this Commonwealth, and shall have power to erect an edifice for their accommodation, and to constitute a faculty or learned body, to consist of such head or heads, and such a number of professors in pharmacy, materia medica, chemistry, and the collateral sciences as they may judge necessary and proper, and to do everything needful and necessary to the establishment of said College and Faculty.

SECT. 3. And be it further enacted, by the authority aforesaid, That the officers of said College be a President and two Vice Presidents, a Secretary and Treasurer, whose respective duties may be assigned by the By-Laws, and who shall be elected at the stated meeting of the College, held in the month of March in each year, and any vacancy that may occur may be supplied by a special election; there shall also be elected a Board of Trustees, consisting of sixteen members, and the officers of the College shall also be ex-officio members of the Board of Trustees; one half of the said Trustees shall be chosen at the stated meeting in March, and the other half at the stated meeting in September; and the said Board of Trustees, nine of whom shall constitute a quorum, shall conduct the ordinary affairs of the College, make such rules and regulations, and do all other things necessary for the government and support of the School of Phar-

macy, as they may deem fit and proper, and perform such duties as are or may be from time to time committed to them by the said College; the acts of the Board of Trustees, however, to be subject to the revision of the College at each stated meeting.

SECT. 4. And be it further enacted, by the authority aforesaid, That if the annual and semi-annual elections for officers of said College, and members of the Board of Trustees, shall not be held on the stated days, the said corporation shall not be thereby dissolved, but the officers and trustees shall continue in office until a new election.

JOSEPH LAWRENCE,
*Speaker of the House of Representatives.*

WILLIAM MARKS, JUN.,
*Speaker of the Senate.*

Approved March 30, 1822,

JOSEPH HEISTER.

# CONSTITUTION.

## ARTICLE I.

This Association shall be called "The Philadelphia College of Pharmacy." Its objects shall be the cultivation, improvement, and dissemination of a knowledge of Pharmacy and its collateral branches of science, and of giving instruction in the same by public lectures.

## ARTICLE II.

The College shall consist of active, honorary and corresponding members.

## ARTICLE III.

The officers of the College shall be a President, two Vice-Presidents, a Recording Secretary, a Corresponding Secretary, a Treasurer, a Librarian, a Curator and an Editor; all of whom shall be elected annually, at the stated meeting in March.

## ARTICLE IV.

The ordinary affairs of the College shall be conducted by a Board of Trustees, consisting of sixteen members, one-half of whom shall be chosen at the stated meeting in March, and the other half at the stated meeting in September. The said Board of Trustees, of which the officers of the College shall be ex-officio members, and of which nine shall constitute a quorum, shall make rules and regulations, and do all other things necessary for the government and support of the School of Pharmacy as it may deem fit and proper, and perform such duties as are

or may be from time to time committed to it by the said College: the acts of the Board of Trustees shall, however, be subject to the revision of the College at each stated meeting.

## ARTICLE V.

The right of voting, of holding offices, and of transacting business, lies solely with the active members.

## ARTICLE VI.

The College shall have a common seal.

## ARTICLE VII.

The College may establish such by-laws for its government and regulation as may be deemed necessary and proper.

# BY-LAWS.

## CHAPTER I.

### OF THE PRESIDENT AND VICE-PRESIDENTS.

ARTICLE I.—The President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall occupy the chair at the meetings of the College, enforce the laws, preserve order, and shall give the casting vote when necessary.

ARTICLE II.—He shall, at the request of any three members in writing, specifying the object in view, call a special meeting of the College.

ARTICLE III.—He shall nominate all committees, unless a ballot be required by the members, or they be otherwise provided for by the By-Laws; and he shall sign all the diplomas and certificates of the College.

ARTICLE IV.—He shall confer the degree on the Graduates of the College at the Annual Commencement.

## CHAPTER II.

### OF THE RECORDING SECRETARY.

ARTICLE I.—The Recording Secretary shall take and preserve correct minutes of the proceedings of the College, preserve all documents belonging thereto that may come into his possession, notify members of their election by the College, and inform the Treasurer of persons so elected.

ARTICLE II.—He shall keep a correct list of the members of the College, with the dates of their election, resignation or death.

ARTICLE III.—He shall issue the notices for the meetings of the College at least one day previous to the time, and furnish

the chairmen of all committees with a copy of the minute of their appointment.

ARTICLE IV.—He shall compile the minutes for publication in the Journal, and by his signature shall attest the certificates of membership and diplomas.

## CHAPTER III.

### OF THE CORRESPONDING SECRETARY.

ARTCLE I.—The Corresponding Secretary shall conduct and preserve the correspondence of the College with corresponding and honorary members, and scientific individuals and societies. It shall be his duty to reply to all foreign communications addressed to or regarding the College. He shall first submit all his proceedings to the President for his approval, and their record shall be read at each stated meeting of the College.

## CHAPTER IV.

### OF THE TREASURER.

ARTICLE I.—The Treasurer shall receive and take charge of the funds of the College, giving bond and security to the President, if required, for the faithful performance of this trust. He shall also hold and issue the certificates of membership and diplomas; shall have the custody of the seal, and affix the same under direction of the College or Board of Trustees.

ARTICLE II.—He shall collect all dues to the College, and shall pay no moneys unless on an order of the President or the Chairman of the Board of Trustees, countersigned by the respective Secretaries of College or Board, as the case may be.

ARTICLE III.—He shall notify the Secretary of the College, in writing, when any new member has signed the constitution and paid his initiation fee, and also when, from any cause, a member has ceased connection with the College.

ARTICLE IV.—He shall present annually to the Board of Trustees, at the stated meeting in February, a statement of his accounts.

## CHAPTER V.

### OF THE LIBRARIAN.

ARTICLE I.—The Librarian shall take charge of all books and pamphlets belonging to the College, and shall report on the condition of the same annually, at the stated meeting in March.

ARTICLE II.—He shall make out two copies of a catalogue of all books and pamphlets belonging to the College, adding thereto the title in full of each one as received. When books are presented to the College, the name of the donor shall be inserted in the catalogues, together with the date of the gift.

ARTICLE III.—One of the catalogues so made out shall be be open to the inspection of members, and the other shall be placed in the archives of the College.

## CHAPTER VI.

### OF THE CURATOR.

ARTICLE I.—The Curator shall take charge of the Cabinet, together with all specimens that may, by donation or otherwise, come into the possession of the College, and shall report on the condition of the cabinet annually, at the stated meeting in March.

ARTICLE II.—He shall make out two copies of a catalogue of all specimens belonging to the College, adding thereto a description of each specimen as received. When specimens are presented to the College the name of the donor shall be inserted in the catalogues, together with the date of the gift.

ARTICLE III.—One copy of the catalogues so made out shall be open to the inspection of members, and the other shall be placed in the archives of the College.

ARTICLE IV.—All specimens in the Cabinet must be properly labelled by the Curator, as far as practicable.

## CHAPTER VII.

### OF THE JOURNAL.

ARTICLE I.—A Journal of such transactions of the College as may be ordered for publication, of original essays and of selections from scientific periodicals and books, shall be published

bi-monthly, and shall be entitled "The American Journal of Pharmacy."

ARTICLE II.—A standing committee of five members shall be elected annually, at the stated meeting in March, of whom the Editor shall be one, which shall be called the Publication Committee.

ARTICLE III.—Original papers read at the pharmaceutical meetings, theses and other original communications in any way recognized by the College, shall be referred to the Publication Committee, which shall examine and publish them at its discretion.

ARTICLE IV.—The Publication Committee shall fix the salary of the Editor, and the subscription price of the Journal, subject to the approval of the College; it shall collect the subscription money for the Journal, seeing that the distribution of the Journal is regularly attended to, and a correct record kept of the subscribers. The committee shall keep a correct account of its receipts and expenditures, of the profits of publication, and of the stock on hand, and shall make an annual report thereof at the stated meeting in March.

ARTICLE V.—The College is not responsible for the opinions and investigations contained in the communications published in the Journal.

## CHAPTER VIII.

### OF MEMBERS.

ARTICLE I.—Any candidate for membership must be proposed in writing by two members at one stated meeting of the College or of the Board of Trustees, and may be balloted for at the next stated meeting respectively of the College or of the Board of Trustees, as the case may be, when three negative votes shall defeat his election.

ARTICLE II.—All applications for membership shall be referred to a committee of three, whose duty it will be to investigate the moral character and professional standing of said applicants, and report at the next stated meeting.

ARTICLE III.—Members may reside in any part of the United States, and upon election shall pay an initiation fee of five dollars, and thereafter a contribution of five dollars annually, in advance.

ARTICLE IV.—Any active member who shall pay into the hands of the Treasurer the sum of fifty dollars at one time, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V.—Any member of the College elected under previous By-Laws of this College as an associate member, shall be entitled to change his membership, if he so wishes, to life-membership, on the payment of twenty-five dollars, and upon the return of his certificate of associate membership shall be entitled to receive a certificate of life-membership.

ARTICLE VI.—Any graduate in pharmacy, conforming in his professional conduct to the Code of Ethics adopted by this College, may be elected an active member.

ARTICLE VII.—Any druggist, manufacturing chemist, manufacturing pharmaceutist, or apothecary, conforming to the Code of Ethics adopted by this College, who is not a graduate in Pharmacy, may be examined by a Committee of Examination to be appointed annually by the Board of Trustees, and if his examination is satisfactory, he may, upon its recommendation, be elected an active member.

ARTICLE VIII.—Any such applicant, who has been established in business for at least six years, shall be eligible for membership.

ARTICLE IX.—Active members shall be entitled to receive the Journal free of charge, unless in arrears, in which case the Treasurer shall notify the Publication Committee to discontinue it until said arrearages are paid.

ARTICLE X.—Members of the College shall at all times have free access to the Library, subject to such rules and regulations as the Library Committee may adopt.

ARTICLE XI.—Pharmaceutists, druggists and chemists residing beyond the limits of the United States, who have attained a

good reputation for integrity, knowledge and ability in their business, may be elected corresponding members of the College.

ARTICLE XII.—No person residing in the United States shall be chosen a corresponding member, nor shall any corresponding member continue such after he shall have removed to reside permanently in the United States, but may become an active member upon the payment of the annual dues.

ARTICLE XIII.—All such persons, as from their knowledge of Materia Medica, Chemistry, Pharmacy, and their collateral branches of science, shall, in the opinion of the College, merit that distinction, may be elected Honorary Members of the College.

ARTICLE XIV.—Corresponding and honorary members shall have the same privileges as active members in regard to the use of the Library and Cabinet, and attending the lectures and meetings of the College, but they shall be exempt from any pecuniary obligation to the College, and shall have no right to vote or hold any office therein.

ARTICLE XV.—Any person elected an active member of the College, neglecting to pay his initiation fee and to sign the Constitution for six months after being informed of his election, shall forfeit his right of membership.

ARTICLE XVI.—No resignation shall be received from any active member of the College unless it be accompanied by a voucher from the Treasurer that his certificate of membership has been returned or destroyed, and all arrearages have been paid. The College may, however, by vote, continue the certificate to one who may have resigned his membership.

ARTICLE XVII.—A member may be expelled from the College for sufficient cause, by a vote of three-fourths of the active members present at a stated or special meeting, notice of the intention of the College to consider the subject of expulsion of a member having been given at a previous meeting, but no member shall be expelled without being notified and having an opportunity of being heard in his own defence.

ARTICLE XVIII.—Any member of the College neglecting the

payment of his contributions for three years after they are due, shall forfeit his right of membership, and is liable to have his name stricken from the list.

ARTICLE XIX.—Every member of the College shall, on paying two dollars, be entitled to a certificate of membership, signed by the President and Vice-Presidents, attested by the Recording Secretary and sealed with the seal of the College; such member covenanting in writing to return said certificate to the College on ceasing to be a member, from any cause whatever. The publication of the certificate of membership as a business advertisement is deemed inconsistent with the spirit of the Code of Ethics.

ARTICLE XX.—A committee of three shall be appointed at the stated meeting in September, whose duty it shall be to report annually the deaths of members of the College, with such biographical notices as may be appropriate.

## CHAPTER IX.

### OF THE TRUSTEES.

ARTICLE I.—The Board of Trustees shall meet once a month, or oftener, if necessary, by adjournments, or on the call of their chairman; and nine members shall constitute a quorum for the transaction of business.

ARTICLE II.—They shall control and regulate the School of Pharmacy; shall appoint Professors as vacancies may occur, or as they may deem expedient, to lecture on Materia Medica, Chemistry, Theory and Practice of Pharmacy and other branches of science.

ARTICLE III.—They shall be entrusted with the election of members as specified in Chapter VIII of these By-Laws.

ARTICLE IV.—They shall appoint a Committee of Examination, who, in conjunction with the Professors in the School of Pharmacy, shall examine and determine the fitness of candidates for the degree, and may, by vote, confer the degree of Graduate in Pharmacy upon such as are recommended as suitable by said Committee.

ARTICLE V.—They shall appoint committees to have the

oversight of the Library, the Cabinet, the Herbarium and the Apparatus of the College; and may from time to time appropriate funds of the College to the increase of these, for the benefit of the members and students.

ARTICLE VI.—They shall have the care and oversight of the College; keeping the hall in repair, with authority to rent such parts as may not be in use for the purposes of the College.

ARTICLE VII.—The minutes of the Board of Trustees shall be read at the meetings of the College for approval or dissent.

## CHAPTER X.

### OF MEETINGS.

ARTICLE I.—The stated meetings of the College for the transaction of business shall be held quarterly, on the last Mondays in March, June, September and December.

ARTICLE II.—Eleven members shall constitute a quorum.

ARTICLE III.—As soon as eleven members shall appear, at or after the appointed time of meeting, the President, or in his absence, one of the Vice-Presidents, or in their absence, a President *pro tempore*, shall take the chair and call the members to order.

ARTICLE IV.—After the meeting has been organized no member shall leave the room without permission from the presiding officer.

ARTICLE V.—The order of business at stated meetings shall be:

1. Members present noted by the Secretary.
2. Minutes of the last meeting read, corrected, if necessary, and adopted.
3. Minutes of the Board of Trustees since the last stated meeting of the College, read.
4. Unfinished business from minutes of last meeting.
5. Business presented by the minutes of the Board of Trustees.
6. Reports of Committees.
7. New Business.
8. Election of Members.
9. Adjournment.

ARTICLE VI.—As an adjourned meeting is the continuation of a previous meeting, after reading the minutes of such meeting, business may be taken up at that point where it was interrupted by the adjournment, and the ordinary order of business followed.

ARTICLE VII.—At a special meeting the College shall immediately proceed to the consideration of the business for which it was convened, and no other business shall be brought before it at such meeting.

ARTICLE VIII.—The Chair shall decide upon questions of order; from which decisions, however, an appeal to the meeting may be had, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE IX.—No motion shall be received unless seconded, nor until the mover, if required by the President or a member, shall have committed it to writing.

ARTICLE X.—Every member, when speaking, shall address the Chair; and when a question is before the meeting, no motion shall be received unless to amend, divide, commit, postpone, or to adjourn; and a motion to adjourn shall always be decided without debate.

ARTICLE XI.—On the call of any two members the yeas and nays shall be ordered; when the question is decided by yeas and nays, each member present shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered upon the minutes.

## CHAPTER XI.

### OF THE PHARMACEUTICAL MEETINGS.

ARTICLE I.—The Pharmaceutical meetings of the College, which shall be exclusively for scientific purposes, shall be held on the third Tuesday in every month, from October to May, both inclusive, or at such times as said meetings may determine.

ARTICLE II.—Five members shall constitute a quorum.

ARTICLE III.—As soon after the hour appointed as five members shall appear, the President, or, in his absence, one of the

Vice-Presidents, or, in his absence, a Chairman *pro tempore*, shall take the chair, and call the members to order.

ARTICLE IV.—A Registrar shall be elected annually, at the meeting in October, to issue the notices, prepare business, and record the proceedings of the Pharmaceutical meetings, and to make selections therefrom for publication in the Journal.

ARTICLE V.—The order of proceedings at these meetings shall be as follows:

1. Minutes of the preceding meeting read, corrected, if necessary, and adopted.
2. Strangers introduced.
3. Donations to library or cabinet received.
4. Reports of committees.
5. Written communications.
6. Verbal communications, miscellaneous business and conversation.

ARTICLE VI.—Members may introduce to these meetings graduates and students of the College, and other persons having an interest in science generally, who, when introduced, shall be entitled to participate in the scientific discussions.

## CHAPTER XII.

### OF CERTIFICATES.

ARTICLE I.—The College shall grant certificates as follows:

1. *To Active or Corresponding Members.*

The Philadelphia College of Pharmacy, instituted to promote and encourage a knowledge of Pharmacy and its collateral branches of science, and to guard against abuses in the preparation and sale of medicines, reposing confidence in the knowledge, skill and integrity of has elected him an (active, corresponding, or life member, as the case may be). In testimony whereof are hereunto affixed the signatures of the proper officers, and the seal of the said College, this day of in the year of our Lord

2. *To Honorary Members.*

The Philadelphia College of Pharmacy has duly elected

an honorary member of the College, as a mark of respect for his scieniific researches and acquirements. In testimony whereof are hereunto affixed the names of the officers, and the seal of the College, this of the month of

## CHAPTER XIII.

### OF AMENDMENTS.

ARTICLE I.—Every proposition to alter or amend these By-Laws shall be submitted in writing at one stated meeting, and may be balloted for at the next stated meeting, when, upon receiving the votes of two-thirds of the members present, it shall become a part of the By-Laws.

ARTICLE II.—No one or more of these By-Laws shall be suspended.

## CHAPTER XIV.

### MISCELLANEOUS.

ARTICLE I.—In all such points of order as are not noticed in these By-Laws the College is to be governed by the established usages in similar institutions.

# CODE OF ETHICS.

The Pharmaceutical profession being one which demands knowledge, skill and integrity on the part of those engaged in it, and being associated with the medical profession in the responsible duties of preserving the public health, and dispensing the useful though often dangerous agents adapted to the cure of disease, its members should be united on some general principles to be observed in their several relations to each other, to the medical profession, and to the public.

The *Philadelphia College of Pharmacy* being a permanent, incorporated institution, embracing among its members a large number of respectable and well educated apothecaries, has erected a standard of scientific attainments, which there is a growing disposition on the part of candidates for the profession to reach; and being desirous that, in relation to professional conduct and probity, there should be a corresponding disposition to advance, its members have agreed upon the following principles for the government of their conduct:

1st. *The College of Physicians of Philadelphia* having declared that any connection with, or monied interest in, apothecaries' stores, on the part of physicians, should be discountenanced; *we in like manner consider* an apothecary being engaged in furthering the interests of any particular physician, to the prejudice of other reputable members of the medical profession, or allowing any physician a percentage or commission on his prescriptions, as unjust toward that profession and injurious to the public.

2d. As the diagnosis and treatment of disease belong to the province of a distinct profession, and as a pharmaceutical edu-

cation does not qualify the graduate for these responsible offices, we should, where it is practicable, refer applicants for medical aid to a regular physician.

3d. As the practice of Pharmacy can become uniform only by an open and candid intercourse being kept up between apothecaries, which will lead them to discountenance the use of secret formulas, and promote the general use and knowledge of good practice, and as this College considers that any discovery which is useful in alleviating human suffering, or in restoring the diseased to health, should be made public for the good of humanity and the general advancement of the healing art,—no member of this College should originate or prepare a medicine, the composition of which is concealed from other members, or from regular physicians.

Whilst the College does not at present feel authorized to require its members to abandon the sale of secret or quack medicines, it earnestly recommends the propriety of discouraging their employment, when called upon for an opinion as to their merits.

4th. The apothecary should be remunerated by the public for his knowledge and skill, and in his charges should be regulated by the time consumed in preparation, as well as by the value of the article sold; although location and other circumstances necessarily affect the rate of charges at different establishments, no apothecary should intentionally undersell his neighbors with a view to their injury.

5th. As medical men occasionally commit errors in the phraseology of their prescriptions, which may or may not involve ill consequences to the patient if dispensed, and be injurious to the character of the practitioner, it is held to be the duty of the apothecary, in such cases, to have the corrections made, if possible, without the knowledge of the patient, so that the physician may be screened from censure. When the errors are of such a character as not to be apparent, without the knowledge of circumstances beyond the reach of the apothecary, we hold him to be blameless in case of ill consequences, the prescription being his guarantee, the original of which should always be retained by the apothecary.

6th. Apothecaries likewise are liable to commit errors in compounding prescriptions,—*first*, from the imperfect handwriting of the physician; *secondly*, owing to the various synonyms of drugs in use, and their imperfect abbreviation; *thirdly*, from the confusion which even in the best regulated establishments may sometimes occur, arising from press of business; and *fourthly*, from deficient knowledge or ability of one or more of the assistants in the shop, or of the proprietor.

We hold that in the first three instances named it is the duty of the physician to stand between the apothecary and the patient, as far as possible; and in the last that he should be governed by the circumstances of the case—drawing a distinction between an error made by a younger assistant incidentally engaged, and a case of culpable ignorance or carelessness in the superior.

7th. As the apothecary should be able to distinguish between good and bad drugs, in most cases, and as the substitution of a weak or inert drug for an active one may, negatively, be productive of serious consequences—we hold that the sale of impure drugs or medicines, from motives of competition, or desire of gain, when pure articles of the same kind may be obtained, is *highly culpable*, and that it is the duty of every honest apothecary or druggist to expose all such fraudulent acts as may come to his knowledge. But in reference to those drugs which cannot be obtained in a state of purity, we should, as occasion offers, keep physicians informed of their quality, that they may be governed accordingly.

8th. As there are many powerful substances that rank as poisons, which are constantly kept by apothecaries, and prescribed by physicians, and which are only safe in their hands, as arsenious acid, vegetable alkaloids, ergot, cantharides, etc.—we hold that the apothecary is not justified in vending these powerful agents indiscriminately to persons unqualified to administer them, and that a prescription should always be required, except in those cases when the poisons are intended for the destruction of animals or vermin—and in these instances only with the guarantee of a responsible person. And we hold that when there is good reason to believe that the purchaser is habitually using

opiates or stimulants to excess, every druggist or apothecary should discourage such practice.

9th. No apprentice to the business of apothecary should be taken for a less term than four years, unless he has already served a portion of that time in an establishment of good character. Apprentices should invariably be entered as matriculants in the School of Pharmacy, and commence attendance on its lectures at least two years before the expiration of their term of apprenticeship; and as the progress of our profession in the scale of scientific attainment must depend mainly upon those who are yet to enter it—it is recommended that those applicants who have had the advantage of a good preliminary education, including the Latin language, should be preferred.

# BY-LAWS OF THE BOARD OF TRUSTEES.

## CHAPTER I.

### OF OFFICERS AND THEIR DUTIES.

ARTICLE I.—The officers of the Board shall be a Chairman and a Secretary, who shall be elected by ballot at the stated meetings of the Board next succeeding the semi-annual elections of the College.

ARTICLE II.—The Chairman shall preside at the meetings of the Board, enforce the laws, preserve order, put all motions to vote when seconded, and appoint the standing committees, excepting the Committee on Examinations. He shall sign all drafts on the Treasurer. He shall give the casting vote, where the Board is equally divided. At the request of three members, in writing, he shall call special meetings of the Board.

ARTICLE III.—In the absence of the Chairman, a chairman *pro tempore* shall occupy the chair, and perform the duties of the Chairman.

ARTICLE IV.—In the election of any committee (other than the standing committees of the Board), unless otherwise ordered, it shall be the duty of the Chairman of the Board to nominate the first member of such committee, who may then be elected by the Board; the member so elected shall nominate the second member of the committee, who may then be likewise elected, and he in turn shall nominate the third member of the committee, and so on until the requisite number has been elected.

ARTICLE V.—The Secretary shall keep regular minutes of the

proceedings of the Board, and a list or roll of its members; preserve all documents belonging thereto; certify all drafts of the Board upon the Treasurer; notify the members of the time and place of meeting, at least one day previous, and furnish the chairmen of all committees with a copy of the minutes of their appointment, as well as individuals of their election to membership. He shall also inform the Treasurer of persons so elected.

## CHAPTER II.

### OF COMMITTEES AND THEIR DUTIES.

ARTICLE I.—The standing committees of the Board (excepting the Committee on Examinations) shall each consist of three members of the College, to be appointed at the first stated meeting of each Board, and shall be as follows:

1st. A Committee on the Hall.
2d. " " " the Library.
3d. " " " the Cabinet and Apparatus.
4th. " " " the Herbarium.
5th. " " " Accounts.
6th. " " " Examinations.

ARTICLE II.—The Committee on the Hall shall have the general care of the hall, and shall provide such conveniences as may be necessary for the accommodation of the College, the Board of Trustees, and the School of Pharmacy.

ARTICLE III.—The Committee on the Library shall procure, with the funds placed at their disposal by the College and Board of Trustees, such works on Pharmacy, Chemistry, Materia Medica, and the collateral sciences, as they may deem proper to be placed in the library; shall negotiate all exchanges of duplicates, and shall keep all books, pamphlets and manuscripts in good order, for the use of members and their apprentices, subject to such rules and regulations as the Committee, with the approbation of the Board, may adopt.

ARTICLE IV.—The Committee on the Cabinet and Apparatus shall procure, with the funds placed at their disposal by the College and Board of Trustees, such specimens and apparatus illustrating Pharmacy, Chemistry, Materia Medica, and the collate-

ral sciences, as they may deem proper, and shall arrange them in proper order, subject to such rules and regulations as the Committee, with the approbation of the Board, may adopt.

ARTICLE V.—The Committee on the Herbarium shall keep the herbarium in order; shall collect plants and place them in a condition to be used in Lectures on Botany, Materia Medica, Pharmacy, &c.; shall effect exchanges and enter into correspondence with individuals, societies and colleges of our own and foreign countries.

ARTICLE VI.—The Committee on Accounts shall examine and approve (by at least one of its members) all bills previous to their being presented to the Board for payment.

ARTICLE VII.—The Committee on Examinations shall consist of five members of the Board of Trustees, one of whom shall be a Professor in the College, and shall be elected by ballot, annually, at the stated meeting of the Board in December.

ARTICLE VIII.—The Committee on Examinations shall examine candidates for membership who are not graduates in Pharmacy, in reference to their fitness to conduct the business of druggist and apothecary, and shall report to the next stated meeting of the Board held after such examination.

ARTICLE IX.—Immediately after the conclusion of the lectures, and in June, the Committee on Examinations together with the Professors, shall receive and examine all original dissertations or theses presented to them by candidates for the diploma of the College, and shall carefully examine all candidates, personally, upon their qualifications to conduct the business of druggist and apothecary, in a reputable and scientific manner, and report their opinion jointly to the Board of Trustees at their next stated meeting after the examination, who shall decide finally upon all such applications for the diploma of the College.

ARTICLE X.—The Committee on Examinations shall deliver to the Board of Trustees, at the stated meeting at which they shall report, the theses and accompanying certificates of all candidates whom the Professors and Committee may jointly recommend as suitable to receive the diploma of the College, which

documents shall then be placed in charge of the Library Committee.

ARTICLE XI.—It shall be the duty of the standing Committees on the Hall, the Library, the Cabinet and Apparatus, and the Herbarium, to report to the Board, at their stated meetings in March and September, or oftener if necessary, whether any and what business has come before them relating to the duties respectively assigned them.

## CHAPTER III.

### OF MEETINGS.

ARTICLE I.—The stated meetings of the Board of Trustees shall be held on the first Tuesday in every month.

ARTICLE II.—Special meetings may be called by resolution of the Board, or at the request of three members in writing.

ARTICLE III.—At a special meeting, after the reading of the call for such meeting, the Board shall immediately proceed to the consideration of the business for which it was specially convened, and no other business shall be brought before it at such meeting.

ARTICLE IV.—At an adjourned meeting, after the reading of the minutes of the previous meeting, business shall be taken up at that point where it was interrupted by the adjournment, and the ordinary order of business followed.

ARTICLE V.—As soon as nine members shall appear at or after the time of meeting, the Chairman or, in his absence, a chairman *pro tempore*, shall take the chair and call the Board to order.

ARTICLE VI.—In the absence of the Secretary a secretary *pro tempore* shall be elected, who shall perform the duties of the Secretary until his arrival.

ARTICLE VII.—After the Board has been organized no member shall leave the room without permission from the Chairman.

ARTICLE VIII.—No motion shall be put until the mover, if required by the Chairman or a member, shall have committed it to writing.

ARTICLE IX.—At stated meetings business shall proceed in the following order:

1. Members present noted by the Secretary.
2. Minutes of the last meeting read, corrected if necessary, and adopted.
3. Unfinished and deferred business.
4. Reports of standing committees.
5. Reports of special committees.
6. Presentation of bills.
7. New business.
8. Proposition of members.
9. Election of members.
10. Adjournment.

ARTICLE X.—Every member when speaking shall address the Chairman; and when a question is before the meeting no motion shall be received unless to amend, divide, commit, postpone or to adjourn; and a motion to adjourn shall always be decided without debate.

## CHAPTER IV.

### OF ELECTION OF MEMBERS.

ARTICLE I.—Members may be elected by the Board of Trustees, as provided for in Chapter VIII of the By-Laws of the College, page 14.

ARTICLE II.—Election of members shall be by ballot.

ARTICLE III.—If the election of any proposed candidate for membership be defeated, the name of such candidate shall not be recorded on the minutes.

## CHAPTER V.

### OF GRADUATION.

ARTICLE I.—Every person upon whom a diploma of this College shall be conferred must be of good moral character, must have arrived at the age of twenty-one years, have attended two courses of each of the lectures delivered in the College, or one course in the College and one course in some other respectable College of Pharmacy, the last of which must be in this College;

or, where there is no such college organized in his locality, in some respectable medical institution in which the same branches are taught.

ARTICLE II.—He shall have served an apprenticeship of at least four years with a person or persons qualified to conduct the drug or the apothecary business; at least three years and three months of which must have expired before the examination; of which circumstances he must produce sufficient evidence.

ARTICLE III.—He shall also be required to produce an original dissertation, or thesis, upon some subject of the Materia Medica, Pharmacy, Chemistry, or one of the branches of science immediately connected therewith, which shall be written with neatness and accuracy in his own handwriting.

ARTICLE IV.—The thesis, with the evidence of apprenticeship and diploma fee, shall be deposited with the senior Professor of the School, on or before the twentieth of February of the session in which the application shall be made.

ARTICLE V.—Students who are in the employ of members of the College shall pay for each matriculation ticket two dollars; all others shall pay four dollars.

ARTICLE VI.—Every student must obtain from the Secretary of the Board of Trustees a matriculation ticket for every session, but only the first matriculation ticket shall be charged for.

ARTICLE VII.—The fee payable to each Professor for each course of lectures shall be twelve dollars.

ARTICLE VIII.—The diploma fee shall be ten dollars.

ARTICLE IX.—Graduates and members of the College, and all students who have paid for two full courses of lectures in the College, shall be admitted to subsequent lectures gratuitously.

ARTICLE X.—The annual examination for degrees will be held early in the month of March; but a second examination will be held in the month of June, of which those students who may not have accomplished their term of service at the annual examination, and other qualified applicants, may avail themselves, notice of application for such examination having been given before the first day of June.

ARTICLE XI.—Any student who shall wilfully and persistently annoy or disturb the Professors and the class, or shall cause any damage to the property of the College, or to the apparatus or specimens exhibited by the Professors, shall be liable for all such damage, and also to expulsion from the class, with the forfeiture of his tickets.

## CHAPTER VI.

ARTICLE I.—Every proposition to alter or amend these By-Laws shall be submitted in writing at one stated meeting, and may be balloted for at the next stated meeting, when, upon receiving the votes of two-thirds of the members present, it shall become a part of the By-Laws.

ARTICLE II.—No one of these By-Laws shall be suspended.

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## COMMITTEES OF THE BOARD OF TRUSTEES.

*Committee on the Hall,*—William C. Bakes, Charles Bullock, Dillwyn Parrish.

*Committee on the Library,*—William Procter, Jr., William C. Bakes, Henry N. Rittenhouse.

*Committee on the Cabinet and Apparatus,*—William Procter, Jr., Edward Parrish, Ambrose Smith.

*Committee on the Herbarium,*—John M. Maisch, Thomas S. Wiegand, James T. Shinn.

*Committee on Accounts,*—Dr. Wilson H. Pile, William J. Jenks, Charles Shivers.

*Committee on Examination,*—Edward Parrish, William J. Jenks, Daniel S. Jones, William Procter, Jr., Charles Shivers.

# ANNOUNCEMENT.

The Annual Courses of Instruction in the College commence on the first lecture day in October, at 7½ o'clock, P. M., and will be continued tri-weekly, on Monday, Wednesday and Friday of every week, at seven and eight o'clock, P. M., until the close of February.

## The Course on Chemistry.

### By Prof. Bridges.

In this Course will be presented a systematic view of the science, its improvements and condition up to the present time. Commencing with caloric, its laws and principal applications, this will be followed by affinity, the laws of chemical combination and chemical notation.

The consideration of the non-metallic elements will be in the order of their value and abundance; the compounds with any previously described being noticed in connection with each, unless of an organic nature. Commencing with oxygen, then follows hydrogen, nitrogen, sulphur, chlorine, iodine, bromine, phosphorus, carbon, boron, silicon, and their combinations with each other, nitrogen and hydrogen excepted.

The metals will be classified according to the nature of the more important compounds they form with oxygen. Basifiable forming alkalies, potassium, sodium, lithium, (and here the compounds of nitrogen and hydrogen, as forming the quasi-metal ammonium, will be noticed:) forming alkaline earths, barium, strontium, calcium, magnesium; forming earths, aluminium, &c.; forming ordinary bases, iron, manganese, chromium, &c., zinc, copper, lead, bismuth, &c. Acidifiable: bismuth, tin, arsenic, antimony, &c. Finally, an intermediate class, forming weak acids or bases, decomposable at a red heat· mercury,

silver, gold, platinum, &c. Under each metal will be introduced their compounds with non-metallic elements and their inorganic salts, with their pharmaceutic relations and preparations in the United States and British Pharmacopœias.

Organic chemistry will conclude the course. In this will be considered all those compounds of general or pharmaceutical interest, which are not included in the other branches of instruction, without any aim at special classification; comprising those which are either natural products or are the results of spontaneous change or decomposition by heat alone, or with alkalies and the action of non-metallic elements, acids, &c.

Commercial impurities (whether of design or accident) will receive due attention, and their character and means of detection will be pointed out.

In connection with all articles of an active character, their toxicological relations will be given, together with their antidotes and methods of detection.

Every article noticed will be exhibited both in the crude and perfect state, and processes for their production, formation and purification detailed, and, when practicable, shown.

In all cases illustrations by experiment will be introduced, in proof of the assertions or facts, and by diagrams, to convey the fundamental principles of the science, and thus more strongly impress the learner's mind.

Text book, Fowne's Chemistry.

## The Course on Materia Medica.

### By Prof. Maisch.

This course will open with a lecture on the proper time and best mode of collecting and preserving the various substances of vegetable and animal origin used in medicine. The drugs will then be considered in a systematic manner, so as to bring those together which resemble each other in their physical properties and structure.

The drugs of vegetable origin will be treated of in accordance with the different organs of plants of which they consist,

either wholly or in part. From the roots proper, the lectures will proceed to consider the underground stems, rhizomes, bulbs, corms and tubers, then the overground stems and woods, the barks, whether obtained from root or trunk, then the herbs and leaves, including those herbaceous drugs which are usually found in commerce, containing all the organs requisite for establishing, by botanical analysis, their true origin. These will be followed by the drugs consisting of flowers or parts of flowers, then by the fruits proper, and finally the seeds.

The products obtained from plants in various ways will next claim attention, and will be considered in groups, based on their physical appearance and chemical constitution, and embracing morbid excrescenses and exudations, volatile oils, fixed oils, resins, oleo-resins, gum-resins, starches, &c.

The consideration of the drugs of animal origin will conclude the course.

This course will aim mainly to present to the student the means and leading characteristics for recognizing each individual drug, and distinguishing it from all others; the physical characters of the drugs, their structure and their chemical relations will, therefore, occupy most of the time allotted to the course, since by these means recognition can be effected and substitutions or adulterations discovered. The botanical and commercial history of the drugs will receive their full share of attention, as will also the important proximate principles upon which the medicinal virtues of the drugs depend or are supposed to depend; a concise view will also be given of the medical properties, the officinal preparations, and the doses of the same.

The drugs derived from the animal kingdom will be arranged and treated of upon the same principles and in a similar manner as those of vegetable origin.

The extensive cabinet and herbarium belonging to the College, as also the private collection of the Professor, in addition to well executed plates and drawings, will furnish ample means of illustration, and, wherever it is deemed necessary, experiments will be made in proof of the facts stated.

## The Course on Botany.

### By Prof. Maisch.

The principles upon which pharmacognosy—to the pharmacist one of the most important branches of materia medica—will be taught, renders a knowledge of botany, to say the least, very desirable. The importance of this science has been fully recognized by the College, by confiding to the Chair on Materia Medica the duty of delivering lectures on Botany during the spring and summer. Though as yet not considered obligatory, it is nevertheless of importance to the student to embrace the opportunity of obtaining a theoretical and practical knowledge of this science.

The course will consist, until further notice, of lectures on general and special morphology, organology, and a concise review of systematic botany, embracing the characteristics of those natural orders and genera which are of greatest importance to the pharmacist. For the present, one afternoon of each week commencing in April, will be devoted to these lectures, and to excursions into the country surrounding Philadelphia, affording to students, besides a healthful recreation, the best means of becoming practically acquainted with the living plants.

## The Course on Theory and Practice of Pharmacy.

### By Prof. Parrish.

This will commence with instructions in the art of weighing and measuring, and a succinct account of the systems of weights and measures authorized by the United States and British Pharmacopœias, and the French or decimal system. Connected with this, the subject of Specific Gravity will claim attention.

The manipulations of the shop and laboratory,—powdering, sifting, solution, filtration, maceration, percolation, the generation, application and management of heat, the water bath, sand

bath and steam bath, and the processes of evaporation and distillation, will be successively described and exhibited.

In this connection the officinal, and some unofficinal preparations will be classified and described, and their proportions, properties and doses exhibited, with a view to familiarize the student with this class of facts, so essential to a ready familiarity with his profession.

Proximate principles of plants, such as starches, gums, sugars, and fixed and volatile oils, resins, and those animal products used in medicine, which will be brought into view in the lectures on Materia Medica, will be noticed in this course only in their more practical relations to the art of preparing and dispensing medicines.

Of the organic acids, alkaloids and neutral principles, those which are prepared by the chemist and pharmacist will come within the scope of this course; the processes of their manufacture will be described, and their uses, properties, applications and tests of purity explained.

The branch of the general subject called Extemporaneous Pharmacy will claim attention toward the end of the course. It will embrace the construction of formulas and prescriptions, and the proper technical language and abbreviations, and the art of combining medicines into eligible forms, and of preparing pills, lozenges, suppositories, mixtures, inhalations, fumigations, cerates, ointments, liniments, plasters, cataplasms, &c.

Dispensing medicines, which is an art of the highest interest and utility to the pharmacist, is an appropriate termination to this course. It embraces a consideration of a variety of apparatus, implements, glass ware, &c., and of those minor manipulations which, when skilfully executed, add so much to the success and reputation of the pharmacist.

The text book of this course is the Treatise on Pharmacy, by Prof. Parrish, third edition.

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The public Commencement for conferring degrees is held near the middle of March.

## The New Hall.

The large and annually increasing classes in the College have rendered it necessary to erect a more commodious building for the lectures, and for the proper arrangement and display of the library, apparatus and several cabinets of specimens.

The Hall is situated on a lot of about 70 by 85 feet, in the vicinity of Tenth and Cherry streets, the main entrance being at No. 145 N. Tenth street, where the Janitor resides, to facilitate the entrance of visitors when the front door is closed, and to give information to strangers.

In the second and third stories are two large lecture rooms, each 50 by 43 feet, with seats so arranged and elevated as to command an unobstructed view of the specimens, diagrams and other illustrations used in the lectures. Professors rooms, to contain their private cabinets and apparatus for illustration, and a society room, for the use of the advanced classes, adjoin these lecture rooms.

On the first floor are rooms for the library, the College cabinets, herbarium and microscope, and for the meetings of the College and Trustees, also for the laboratory for practical instruction in chemistry and pharmacy.

The ceilings throughout the building are high; it is lighted from all sides (the laboratory by sky-lights), and being situated back from the street all the rooms are remarkably quiet and well adapted to the purposes for which they are designed.

## Practical School.

The Alumni of the College have recently subscribed a fund for the establishment of a practical laboratory, and a room has been appropriated to this in the new Hall. It is the intention of the College to open such a department, as part of the scheme of instruction, as soon as the necessary arrangements can be

perfected. The particulars cannot be announced for the session 1869–70, though the faculty design to render the room in some degree available to the students, even in advance of the complete organization of the laboratory.

## Collateral Studies.

Many students coming to Philadelphia to spend a winter in attendance upon the College, are desirous of occupying a portion of the time in general self-culture and improvement, for which Philadelphia affords great facilities. The Museum of the Academy of Natural Sciences will be open to members of the Class on Tuesday and Friday afternoons—tickets obtained from either of the Professors—and, by special arrangement, students interested in natural history may obtain the other facilities of the Academy free of charge. Private instructions in ancient and modern languages and in mathematics may be readily obtained, and the various "Commercial Institutes" afford facilities for improvement in penmanship, book-keeping and other useful branches of knowledge.

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## Remunerative Employment.

A few of those resorting to the College from a distance can obtain employment on moderate salaries during attendance upon it, by writing to Mr. W. C. Bakes, No. 800 Arch Street, who keeps the register of applicants provided by the College. But a small proportion only of these can obtain suitable situations, and those who do not will be at an expense of from $5 to $8 a week for board.

# Roll of Members of the College,

*With the date of their Election.*

* Deceased. † Resigned. ‡ Dropped from Roll.

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ORIGINAL MEMBERS.

- Daniel B. Smith, 1821
- *Warder Morris, 1821
- George D. Wetherill, 1821
- Peter Williamson, 1821
- *Frederick Klett, 1821
- *Frederick Brown, 1821
- Charles Ellis, 1821
- *Thomas Oliver, 1821
- *Alex. Fullerton, 1821
- *Algernon S. Roberts, 1821

* Joseph Reakirt, 1821
Samuel F. Troth, 1822
Edward Roberts, 1824
* Samuel C. Shepherd, 1825
* Samuel P. Shoemaker, 1826
John Horn, 1826
William Biddle, 1826
William Hodgson, Jr., 1828
George B. Wood, M. D., 1829
John C. Allen, 1830
Dillwyn Parrish, 1831
* Franklin Bache, M. D., 1831
Joseph C. Turnpenny, 1834
Thomas H. Powers, 1834
Thomas J. Husband, 1834
† John Bringhurst 1834
Samuel Simes, 1835
Joseph Carson, M. D., 1836
William Wetherill, M. D., 1837
Thomas P. James, 1838
‡ Henry W. Worthington, 1838
Richard W. Test, 1839
Robert Bridges, M. D., 1839
John Gilbert, 1839
Ambrose Smith, 1839
‡ Claudius B. Linn, 1840
William Procter, Jr., 1840
Paul G. Oliver, 1841
‡ John H. Ecky, 1841
* Henry C. Blair, 1842
Robert Shoemaker, 1843
Caleb H. Needles, 1843
Edward Parrish, 1843
John Y. Goodyear, 1843
Jacob L. Smith, 1843
† William P. Troth, 1844
† John Harris, M. D., 1845
William Ellis, 1845
John Reakirt, 1845
Robert C. Brodie, 1845
Samuel N. James, 1845
Daniel S. Jones, 1845
William J. Jenks, 1846
† Alexander F. Hazard, 1846
Daniel L. Miller, Jr., 1846
James N. Marks, 1846
Robert C. Davis, 1846
‡ Benjamin R. Smith, 1847
‡ Francis Zerman, 1847
Alfred B. Taylor, 1848
Athanase Roidot, 1848
Charles Bullock, 1849
* Thomas Gegan, 1849
* Frederick L. John, 1849
‡ Charles S. Rand, 1851
Edmund A. Crenshaw, 1851
* Robert P. Thomas, M. D., 1851
‡ Charles H. Dingee, 1851
‡ Joseph A. McMakin, 1852
Caleb R. Keeney, 1852
Thomas S. Wiegand, 1852
Evan T. Ellis, 1852
† Alfred A. B. Durand, 1852
† Bradford Ritter, 1853
† Henry M. Troth, 1853
‡ William Taylor, 1854
† John C. Savery, 1854
James L. Bispham, 1854
Benj. J. Crew, 1855
Samuel S. Bunting, 1855
† Samuel S. Garrigues, 1855
Henry N. Rittenhouse, 1855
* Lewis M. Emanuel, 1855
† Herman Leuchsenring, 1855
Andrew W. Gayley, 1856
‡ Thomas Weaver, 1856

William C. Bakes, . . . 1856
‡Richard Peltz, . . . 1856
T. Morris Perot, . . . 1856
†F. C. Hill, . . . 1856
†M. Henry Kollock, . . 1856
William Weightman, . . 1856
Edward H. Hance, . . . 1857
Charles Shivers, . . . 1857
Wilson H. Pile, M. D., . 1857
Jacob Dunton, . . . 1857
William B. Webb, . . . 1857
Adam H. Wilson, . . . 1858
*Theodore Dilks, . . . 1858
‡Thomas Lancaster, . . 1858
J. Bloomfield Wetherill, . 1858
‡Matthew W. Selfridge, . 1858
*W. H. Squire, . . . 1858
David L. Stackhouse, . . 1858
‡John Field, . . . . 1858
J. Lewis Crew, . . . 1858
Alfred Tatem, . . . . 1858
James T. Shinn, . . . 1858
†Pierce B. Wilson, . . 1858
‡J. Clarkson Griffith, . . 1858
William R. Warner, . . 1859
William Evans, Jr., . . . 1859
George C. Evans, . . . 1859
George J. Scattergood, . . 1859
Edward Donnelly, M. D., . 1859
Emilius Herwig, . . . 1859
Joseph Landschutz, . . 1859
Peter J. Hassard, . . . 1859
Gustavus Krause, . . . 1859
Alfred W. Test, . . . 1859
J. A. Heintzelman, . . . 1859
†E. Raphael Perrot, . . 1860
Robert England, . . . 1860
John M. Maisch, . . . 1860
‡John E. Clarke, . . . 1860
‡Henry F. Geger, . . . 1860
John E. Carter, . . . 1860
Roger Keys, . . . . 1860
Thomas A. Lancaster, . . 1860
Theodore A. Keffer, . . 1861
Augustus F. W. Neynaber, . 1861
William B. Thompson, . . 1862
†I. Henry Abbott, . . . 1862
George Ashmead, . . . 1863
George W. Eldridge, . . 1864
F. A. Keffer, M. D., . . 1864
†W. H. Githens, . . . 1864
†Lewis G. Diehl, . . . 1864
Richard N. Shoemaker, . . 1864
Frederick Brown, Jr., . . 1864
Edwin Tomlinson, . . . 1864
S. Mason McCollin, . . 1865
Charles P. Rubincam, . . 1865
Alfred Mellor, . . . . 1865
Theodore A. Royal, . . 1866
H. T. Peck, . . . . 1866
Henry Cramer, . . . 1866
Edward G. Jones, . . . 1866
Samuel T. Jones, . . . 1866
Isaac W. Smith, . . . 1867
Alonzo Robbins, . . . 1867
William J. Miller, . . . 1867
Charles L. Eberle, . . . 1867
‡Edmund Pollitt, . . . 1867
Henry A. Vogelbach, . . 1867
Joseph P. Bolton, . . . 1867
‡Arthur H. Little, . . . 1867
H. C. Archibald, . . . 1867
C. C. Moore, . . . . 1867
George Y. Shoemaker, . . 1868
H. B. Lippincott, . . . 1868
John Bley, . . . . 1868
Charles H. Eggert, . . . 1868
William H. Webb, M.D., . . 1868
George M. Snowden, . . 1868
Edward Gaillard, . . . 1868
William McPherson, . . 1868
George D. Blomer, . . . 1868
Charles L. Jefferson, . . 1869
W. H. Walling, . . . 1869
C. F. Gristock, . . . 1869
Clemmons Parrish, . . . 1869
Louis G. Bauer, . . . 1869
Richard Walmsley, . . . 1869
Israel J. Grahame, . . . 1869
Charles E. Haenchen, . . 1869
Andrew Blair, . . . . 1869
William G. Buchanan, . . 1869
Henry C. Eddy, . . . 1869
Samuel Campbell, . . . 1869
James S. Robinson, . . 1869
Louis A. Bates, . . . 1869
George W. Kennedy, . . 1869
William McIntyre, . . . 1869
Henry K. Bowman, . . . 1869
M. G. Rosengarten, . . 1869
Louis Koch, . . . . 1869

## ASSOCIATE MEMBERS.

John Rickey, Jr., Trenton, N. J.
John F. Heinitsch, Lancaster, Pa.
Elias Maynard, Boston, Mass.
Michael Wolf, M. D., Cincinnati, O.
Edward La Roque, Baltimore, Md.
Peter Madeira, Pittsburgh, Pa.
Marshall C. Slocum, New York.
Samuel Elliott, Carlisle, Pa.
John Milhau, New York.
George W. Andrews, Baltimore, Md.
John F. Stahl, Cincinnati, O.
Bernard Mesthe.
Jas. Cook, M. D., Fredericksburg, Va.
Charles Bonsall, Cincinnati, O.
E. H. Heinitsh, Columbia, S. C.
James Smith, Lancaster, Pa.
John W. Swaim, New Orleans.
*Franklin Scammon, Hallowell, Me.
Jackson B. Wood, Richmond, Va.
W. Ralph Higgenbotham.
Albert E. Ebert, Chicago,
Flodoardo Howard, Washington, D. C.
W. L. Atlee, M. D., Philadelphia, Pa.
*George W. Merchant, Lockport, N. Y.
Lansing B. Swan, Rochester, N. Y.
Nathaniel W. Thatcher, Chilicothe, O.
Thomas W. Harris, Jacksonville, Tenn.
Thomas G. McKenzie, Baltimore, Md.
Thomas Seabrook, Princeton, N. J.
James C. Wells, Rochester, N. Y.
Edward McPherson, New Orleans.
Edward Barry, M. D.. Augusta, Ga.
William J. Allinson, Burlington, N. J.
Llewellyn S. Haskell, New York.
Edward S. Wayne, Cincinnati, O.
Edward McInall, Wilmington, Del.
Joseph M. Turner, Savannah, Ga.
Peter V. Coppuck, Mount Holly, N. J.
J. C. C. Hughes, Pottsville, Pa.
* Joseph Laidley, Richmond, Va.

## HONORARY MEMBERS.

* John Redman Coxe, M. D., Philada.
T. G. Clemson, "
* Prof. Jno. K. Mitchell, M.D., "
* Prof. R. Dunglison, M. D., "
Prof. Sam'l Jackson, M. D., "
Elias Durand, "
* Wm. Darlington, West Chester, Pa.
* Prof. Benj. Silliman, N. Haven, Con.
Jacob Bigelow, M. D., Boston, Mass.
Freeman Dana, M. D., " "
Robert Peter, Lexington, Ky.
Thos. J. Wray, M. D., Augusta, Ga.
John Torrey, M. D., New York.
Prof. Thomas Nuttall, Boston, Mass.
Asa Gray, Cambridge, Mass.
Charles Murray, Beunos Ayres.
Daniel Hanbury, London.
Henry Deane, Clapham, "
Wm. Crookes, F. R. S., "
Jno. Eliot Howard, F. L. S., "
Prof. Dr. Fred. Mohr, Coblentz.
Prof. Dr. Fred. Wöhler, Gottingen.
Prof. Dr. A. W. Hofmann, Berlin.
Prof. Dr. K. Von Schroff, Vienna.
Ivan Pfeffer, St. Petersburg.
Prof. Dr. De Vry, Rotterdam.
Prof. Dr. X. Landerer, Athens.
Prof. Dr. F. A. Fluckiger, Bern.
Prof. T. Redwood, London.
* Jacob Bell, "
John T. Barry, "
Robert Alsop, "
L. Derosne, Paris.
Prof. Pelletier, "
C. Gerhart, "
V. Regnault, "
* Prof Michael T. Faraday, London.
Prof. Justus von Liebig, Munich, Bav.
Michael Donovan, Dublin.
Prof. M. Berthelot, France.
Prof. Louis Miahle, "
Prof. A. Bussy, "
E. Pasteur, "
Auguste Cahours, "
Pierre François Guillaume Boullay, "
W. Dankwortt, Magdeburg.
Joseph Dittrich, Prague.
Prof. Adolph Duflos, Breslau.
Dr. G. C. Wittstein, Munich.
C. Frederking, Riga.
Prof. J. S. Stas, Belgium.
Prof. De Lucca, Naples.
Carlos Ferrari, Madrid.

*Deceased.

## CORRESPONDING MEMBERS.

| | |
|---|---|
| John Attfield, | London. |
| Henry B. Brady, | New Castle on Tyne. |
| John Abrams, | Liverpool. |
| T. B. Groves, | Weymouth. |
| Charles Tichbourne, | Dublin. |
| F. Crave Calvert, | Manchester. |
| John Mackay, | Edinburgh. |
| W. W. Stoddart, | Bristol. |
| J. C. Brough, | |
| Augustin Delondre, | Sevres. |
| Prof. L. R. LeCanu, | Paris. |
| Dr. J. Leon Soubeiran, | " |
| Stanislaus Martin, | " |
| E. Robinet, | " |
| François L. M. Dorvault, | " |
| M. Gobley, | " |
| Prof. M. A. Chevallier, | " |
| Prof. Planchon, | " |
| Paul Antoine Cap, | " |
| Prof. Dr. H. Ludwig, | Jena. |
| Prof. Dr. L. A. Buchner, | Munich. |
| Prof. Dr. J. B. Henkel, | Tubingen. |
| Dr. Rieckher, | Marbach. |
| Albert Frickhinger, | Nirdlingen. |
| A Margraff, | Berlin. |
| Dr. Carl Schacht, | Berlin. |
| Dr. Clamor Marquart, | Bonn. |
| A. Scheurer von Waldheim, | Vienna. |
| — Beckert, | Vienna. |
| Dr. J. J. Bernoully, | Basel. |
| A. Gruner, | Bern. |
| L. Lade, | Geneva. |
| — Walter, | Amsterdam. |
| D. A. Van Bastelaer, | Charleroi. |
| Prof. Norbert Gille, | Brussels. |
| Prof. Dr. G. Dragendorff, | Dorpat. |
| Dr. Arthur Casselmann, | St. Petersb'g. |
| Dr. Bjoerklund, | " |
| Louis Moska, | Turin. |
| Nicholas Sinimberghi, | Rome. |
| Dr. Gastinel, | Cairo. |
| Dr. Theodore Peckolt, | Cantagallo. |

# Catalogue of the Graduates

OF THE

# PHILADELPHIA COLLEGE OF PHARMACY,

WITH THE DATES OF THEIR GRADUATION.

| | | | |
|---|---|---|---|
| Abbott, John Henry | 1851 | Blair, Andrew, | 1865 |
| Abernethey, J. M. | 1861 | Blair, Henry C. | 1836 |
| Alexander, Maurice W. | 1854 | Blair, Henry C. | 1866 |
| Allaire, Charles B. | 1867 | Blithe, Henry, | 1862 |
| Allen, Harvey | 1859 | Blizzard, Joseph E. | 1867 |
| Allen, John C. | 1829 | Blomer, Augustus P. | 1865 |
| Allen, William E. | 1866 | Blomer, George D. | 1861 |
| Allen, William M. | 1862 | Bolton, Joseph P. | 1860 |
| Andrews, John R. | 1848 | Bonsall, Charles T. | 1853 |
| Archibald, Henry C. | 1867 | Borhek, J. T., Jr. | 1867 |
| Armstrong, James A. | 1855 | Boring, Ed. McC. | 1867 |
| | | Bourke, Joseph M. | 1867 |
| Babb, Peter | 1842 | Bower, Henry C. | 1854 |
| Bache, Charles L. | 1849 | Bowman, Henry K. | 1869 |
| Bachman, Adolphus, | 1863 | Boyd, Abraham | 1868 |
| Bachman, Alexander | 1853 | Boyd, John W. | 1860 |
| Baker, Jacob L. | 1846 | Boyer, Caverly | 1843 |
| Baker, James R. | 1857 | Braddock, Charles S. | 1851 |
| Baker, T. Roberts, | 1852 | Braddock, Isaac A. | 1866 |
| Baker, William G. | 1842 | Bradley, Thomas F. | 1868 |
| Bakes, William C. | 1855 | Bringhurst, Ferris | 1857 |
| Bancroft, Joseph W. | 1855 | Bringhurst, John | 1832 |
| Banes, John M. | 1856 | Brodie, Robert C. | 1844 |
| Bannvart, Charles A. | 1855 | Bronson, Eugene C. | 1868 |
| Barnitz, Frank M. | 1866 | Brooks, Edward | 1830 |
| Barr, Thomas H. | 1854 | Brooks, Henry | 1838 |
| Bartram, Ernest | 1867 | Brooks, Joseph H. | 1829 |
| Bassett, William H., | 1855 | Broughton, John | 1854 |
| Bates, Louis A. | 1869 | Brower, Noah B. | 1857 |
| Battey, Robert | 1856 | Brown, Albert P. | 1862 |
| Beam, Isaac R. | 1856 | Brown, Frederick, | 1861 |
| Beck, John W. | 1868 | Brown, Frederick J. | 1858 |
| Bell, James S. | 1869 | Brown, Samuel A. | 1867 |
| Bell, W. D. | 1860 | Brown, Samuel W. | 1833 |
| Berger, Christian | 1863 | Brown, Thomas J. | 1867 |
| Bickley, Mortimer H. | 1854 | Bryan, John E. | 1860 |
| Biddle, John W. | 1856 | Buchanan, Wm. F. | 1859 |
| Bines, Samuel M. | 1848 | Buchanan, W. G. | 1862 |
| Bispham, James L. | 1854 | Buckman, James, | 1867 |

Buehler, Edward H. . . 1864
Bunn, Jonathan, H. . . 1857
Bunting, Samuel S. . . 1850
Burton, David F. . . . 1852
Buss, Oliver . . . 1864

Cabe, Raphael . . . 1858
Cadbury, John W. . . . 1858
Caldwell, James M. . . . 1857
Campbell, Hugh . . 1866
Campbell, James B. . . 1851
Campbell, Samuel . . . 1857
Canby, George . . . 1851
Canèdo, Cipriano . . . 1852
Carberry, P. J. L. . . . 1867
Carbonell, Felix Benjamin . 1861
Carroll, Augustus D. . . 1855
Carter, John E. . . . 1858
Carter William J. . . . 1842
Chapman, Wm. B. . . . 1834
Chenoweth, John T. . . 1856
Cheston, Elijah, Jr. . . 1853
Chipman, Edward D. . . 1862
Clark, A. B. . . . 1868
Clark, Thomas C. . . . 1865
Clark, Thomas M. . . 1854
Claypoole, John . . . 1860
Clothier, Wm. P. . . . 1861
Corkburn, James, Jr. . . 1835
Coggeshall, George D. . . 1828
Coggins, Franklin . . . 1863
Collom, Charles D. . . . 1862
Colman, Francis A. . . 1860
Conté, Horace . . . 1850
Coombe, Thomas R, . . 1859
Cooper, William H. . . . 1862
Corbidge, J. E. . . . 1868
Cornell, Charles M. . . . 1848
Cornell, Edward A. . . 1865
Corse, William H. . . . 1840
Corson, Joseph K. . . . 1858
Costill, Samuel L. . . . 1849
Cowell, Cincinnatus M. . . 1860
Cox, Richard S. . . . 1854
Craven, James . . . 1869
Creecy, Wm. Pryor . . . 1860
Crenshaw, Edmund A. . . 1849
Cressler, Charles H. . . 1861
Crew, James H. . . . 1847
Croft, Henry C. . . . 1864
Croft, Samuel F. . . . 1867
Cummings, Joseph J. . . 1869
Cummings, William T. . . 1856
Cunningham, John M. . . 1864
Cuthbert, Richard W. . . 1867

Dancy, Frank B. . . . 1857
Dare, Charles F. . . . 1861
Davis, Aaron R. . . . 1869
Davis, Benjamin B. . . . . 1850
Davis, George H. . . . . 1861
Davis, Henry H. . . . 1869
Davis, John L. . . . 1852
Davis, John W. . . . 1853
Davis, Robert C. . . . 1844
Dawes, J. Crawford . . 1841
Dawson, Alexander . . 1827
Day, Robert L. . . . 1868
De Choudens, Joseph F. . . 1857
De Huff, John G. . . . 1869
Dick, George H. . . . 1858
Dickson, John, . . . 1846
Dickson, John M. . . . 1856
Dickson, Robert W. . . 1862
Diehl, C. Lewis . . . 1862
Dilkes, Theodore . . . 1856
Dilks, S. Levin . . . 1868
Dillard, Robert K. . . . 1854
Dingee, Charles H. . . . 1826
Dingee, John H. . . . 1828
Ditman, Andrew J. . . . 1865
Dobbins, Edward T. . . 1862
Dobbins, Albert N. . . . 1866
Dodson, Charles G. . . . 1859
Donnelly, Edward . . . 1843
Douglass, John Wyeth . . 1840
Duhamel, Augustine J. L. . 1834
Dunton, Jacob . . . 1855
Dupuy, Powhatan E. . . 1859
Durand, Alfred A. B. . . 1851

Eastlack, Horace W. . . 1868
Eayre, Mortimer H. . . . 1868
Eberle, Charles L. . . . 1859
Ebert, Albert E. . . . 1864
Eggert, Charles H. . . 1854
Eldridge, George W. . . 1863
Elliott, Frederick G. . . 1868
Elliott, James L. . . . 1837
Elliott, William D. . . . 1851
Ellis, Evan T. . . . 1847
Ellis, William . . . 1834
Emmanuel, Louis M. . . 1854
England, Howard . . . 1868
England, Robert . . . 1846
Epting, Charles W. . . . 1855
Erwin, Bertine S. . . . 1867
Estlack, Thomas . . . 1844
Evans, Jonathan, Jr. . . 1835
Evans, William, Jr. . . . 1856
Evans, William H. . . . 1861
Eyre, William . . . 1859
Eyster, Christ. Ed. . . . 1869

Fairthorne, Robert . . . 1855
Farr, W. L. . . . 1868
Faunce, John H. . . . 1853
Fell, Edward R. . . . 1858

Fetter, Marcus C. . . . 1862
Figueroa, Francis A. . . 1858
Finley, John D. . . . 1851
Fischer, Theophilus. . . 1862
Fisher, William R. . . . 1820
Fleming, William S. . . 1857
Foulke, James . . . 1868
Fox, Daniel S. . . . 1863
Franklin, Thomas H. . . 1860
Fritchey, James G. . . . 1869
Fritsch, Herman . . . 1860
Fronefield, Charles, Jr. . . 1860
Fronheiser, James G. . . 1868
Früh, Carl . . . 1869
Fuchs, Peter P. . . . 1858

Gaillard, Edward . . . 1854
Garrigues, Samuel S. . . 1851
Garwood, W. T. . . . 1859
Gegan, James J. . . . 1860
Gerhart, Herman . . . 1856
Gerhart, Samuel . . . 1854
Geyer, Henry T. . . . 1859
Gibson, Robert . . . 1861
Giffard, William H. . . . 1861
Githens, William H. H. . . 1861
Gold, Hiram . . . 1864
Goodyear, David F. . . 1851
Goodyear, John Y. . . . 1837
Gormely, George M. . . 1852
Griffith, J Clarkson, . . . 1855
Gross, George A. . . . 1865
Grotjan, P. Adolphe . , 1842
Guillou, Alfred . . . 1834
Gutekunst, Frederick . . 1853
Guthrie, Joseph T. . . . 1856

Haehnlen, Jacob F. . . . 1860
Haig, Charles R. . . . 1867
Haines, Thomas . . . 1839
Hambright, Edwin A. . . 1867
Hambright, George M. . . 1863
Hance, Edward H. . . . 1854
Hancock, Charles W. . . 1857
Hand, Charles . . . 1869
Hand, Richard T. . . . 1862
Hansell, Amos . . . 1858
Hansell, George . . . 1862
Hansford, William P. . . 1833
Harding, Henry . . . 1867
Harmer, James M. . . . 1867
Harres, J. Henry . . . 1853
Harris, Levi H. . . . 1854
Harris, Thomas W. . . . 1838
Harrison, William D. . . 1861
Harrop, Joseph . . . 1868
Harry, David W . . . 1859
Harry, Jacob . . . 1867
Harry, James W. . . . 1865

Harte, James H. . . . 1856
Hartzell, Charles . . . 1849
Harvey, David W. . . . 1859
Hasbrook, William L. . . 1837
Hastings, Samuel . . . 1849
Hathwell, Charles . . . 1828
Hayes, George E. . . . 1861
Hays, N. W. C. . . . 1867
Hecker, Jacob K. . . . 1868
Hedges, T. Jefferson . . 1861
Heintzleman, Joseph A. . . 1859
Heller, Marx M. . . . 1865
Hendel, Samuel D. . . . 1852
Hendry, Charles D, . . . 1830
Henshey, B. B. . . . 1858
Heydenreich, Emile . . 1861
Heydenrick, F. Victor . . 1858
Heyser, William . . . 1852
Higbee, Hugh H. . . . 1856
Higinbotham, W. Ralph . . 1861
Hill, Franklin C. . . . 1848
Hillary, John F. . . . 1865
Himmelwright, F. E. . . 1867
Hoagland, Pratt R. . . . 1868
Hoeckley, Benjamin F. . . 1837
Hoffecker, James P. . . 1855
Hoffman, C. Ferdinand . . 1863
Hoffman, John V. . . . 1867
Holden, John . . . 1852
Hollemback, William . . 1858
Holstein, Charles E. . . 1869
Hopkins, James . . . 1835
Hopkins, Thomas C. . . 1839
Hopper, Edward . . . 1833
Hornbeck, Molton E. . . 1862
Huber, Milton . . . 1865
Hughes, C. Collin . . . 1857
Hughes, Louis . . . 1851
Hughes, T. Curtis C. . . 1847
Husband, Thomas J. . . . 1833
Husband, Thomas, Jr. . . 1869
Hutchison, Hamilton . . 1869

Inskeep, E. W. . . . 1858
Isard, George W. . . . 1869

Jacobs, Henry H. . . . 1862
Jacoby, David S. . . . 1854
Jameson, George L. . . 1858
Jeannot, George Edward . 1864
Jefferson, Charles L. . . 1859
Jenks, William J. . . . 1842
Jones, Alfred . . . 1852
Jones, Daniel S. . . . 1843
Jones, D. Augustus . . 1869
Jones, Edward B. . . . 1867
Jones, Edward C. . . . 1864
Jones, Isaac C. . . . 1850
Jones, Joshua S. . . . 1843

Jones, Samuel T. . . . 1864
Jorden, Henry A. . . . 1868

Karch, Joseph . . . 1868
Kaufman, John F. . . . 1857
Kay, Samuel D. . . . 1868
Kearney, Howard C. . . 1861
Kearney, William H. L. . . 1856
Keen, Francis . . . 1865
Keeney, Caleb H. . . . 1845
Keffer, Frederick A. . . 1860
Kelty, Clement . . . 1869
Kemble, Henry B. . . . 1860
Kemble, James . . . 1861
Kendall, John H. . . . 1856
Kennedy, Charles W. . . 1865
Kennedy, Francis . . . 1859
Kennedy, George W. . . 1869
Kennedy, Robert G. . . 1837
Kenworthy, James . . . 1863
King, William . . . 1851
Kirkbride, Joseph C. . . 1863
Kitchen, William K. . . 1835
Klump, Charles C. . . . 1868
Kneeshaw, William W. . . 1866
Knight, William E. . . . 1838
Kollock, M. Henry . . . 1855
Kolp, C. H. . . . 1869
Krewson, William E. . . 1869
Kuhn, Louis De Barth . . 1851
Kurtz, Augustus M. . . 1867

Laidley, Joseph . . . 1850
Laird, William R. . . . 1866
Lamparter, Eugene . . . 1869
Lancaster, Thomas . . . 1855
Lancaster, Thomas A. . . 1859
Lawall, Edmund D. . . . 1855
Laws, James, Jr. . . . 1848
Laycock, W. . . . 1858
Leaher, Samuel . . . 1847
Leamy, James C. . . . 1855
Lee, Clement J. . . . 1835
Lee, Hiram C. . . . 1846
Lehlback, Paul Frederick . 1863
Leidy, Thomas . . . 1845
Lemberger, Joseph . . . 1854
Leslie, Henry W. . . . 1862
Letchworth, Albert S. . . 1840
Letts, Charles . . . 1861
Leuchsenring, Hermann . . 1855
Levering, P. Wharton . . 1866
Levy, Lewis . . . 1861
Lewis, David Jr. . . . 1854
Lewis, John R. . . . 1847
Lillard, Benjamin . . . 1868
Lindsay, John B. . . . 1865
Link, Ferdinand . . . 1860
Linn, Claudius B. . . . 1838

Lippincott, Robert C. . . 1866
Little, Arthur H. . . . 1867
Livermore, William W. D. . 1849
Locusson, Joseph S. . . 1867
Long, John C. . . . 1861
Louden, G. Graves . . . 1847

Macpherson, William . . 1860
Markley, George H. . . 1854
Marshall, Robert T. . . 1868
Martin, Isaac J. . . . 1835
Mason, William E. F. . . 1861
Msasenburg, T. L. . . . 1857
Matthews, Charles C. . . 1868
Mattocks, Brewer . . . 1861
McBride, James . . . 1856
McCollin, S. Mason . . 1864
McConaughy, Albert D. . . 1857
McCormick, Charles . . 1826
McDermott, Charles A. . . 1858
McElroy, Archibald C. . . 1864
McElroy, James B. . . . 1865
McFee, George W. . . . 1855
McIlvaine, J. L. . . . 1860
McInall, Edward Jr. . . 1868
McIntyre, William . . . 1863
McKee, James H. . . . 1861
McKim, Andrew . . . 1843
McLeroth, A. Hope . . 1859
McMakin, Joseph A. . . 1845
McMinn, Joseph H. . . 1867
McMullen, Jacob B. . . 1857
McPike, William C. . . 1866
Mecray, Alexander M. . . 1860
Mecray, James . . . 1861
Mellor, Alfred . . . 1863
Mercein, James R. . . . 1857
Mercer, John T. . . . 1857
Merklein, Charles H. . . 1869
Miles, John I. . . . 1858
Milleman, Philip . . . 1866
Miller, Adolph W. . . . 1862
Miller, William J. . . . 1854
Milliac, John A. . . . 1866
Milligan, Decatur . . . 1861
Milner, James P. . . . 1865
Mitchell, George H. . . 1844
Mitchell, Thomas R. F. . . 1837
Mittnacht, Henry . . . 1855
Montgomery, Thomas H. . 1851
Moore, Charles C. . . . 1867
Moore, Joseph E. . . . 1864
Moore, Orlando L. . . . 1868
Moore, Robeson . . . 1829
Moorehead, William W. . 1869
Morell, Elijah S. . . . 1863
Morgan, David U. . . . 1855
Morris, Henry B. . . . 1864
Morris, J. H. Morton . . 1852

Moseley, A. . . . 1867
Moser, Americus H. . . 1865
Mullen, Wesley W. . . . 1862
Murray, Talbot C. . . . 1863

Naulty, William H. . . 1862
Neal, Leander . . . 1857
Needles, Caleb H. . . . 1841
Needles, William N. . . 1845
Newbold, Thomas M. . . 1866
Newman, George A. . . 1860
Newton, Alfred W. . . . 1864
Newton, John S. . . . 1866
Nichols, William St. Clair . 1844
Noble, Thomas . . . 1859
Nolen, Albert V. . . . 1858
Notson, Charles B. . . . 1865
Notson, George W. . . . 1864

Ober, Gustavus . . . 1837
O'Brien, T. Bryan . . . 1868
Ogden, Edward H. . . 1853
Olmsted, A. J. . . . 1835
Orth, Frederick C. . . . 1865
Ottinger, Franklin . . . 1868

Painter, Emlen . . . 1866
Palethorp, John H. Jr. . . 1854
Pancoast, Dillwyn P. . . 1856
Parrish, Clemmons . . 1868
Parrish, Dillwyn . . . 1830
Parrish, Edward . . . 1842
Parrish, William G. . . 1860
Parry, George R. . . . 1862
Patrick, George W. . . 1846
Patterson, Robert M. . . 1846
Paynter, Woodman S. . . 1856
Peck, Aulay W. . . . 1869
Peck, H. T. . . . 1862
Pedrick, Charles W. . . 1855
Peltz, Richard . . . 1852
Penrose, Stephen F. . . 1869
Perot, Elliston L. . . . 1855
Perot, Joseph S. . . . 1852
Perot, T. Morris . . . 1849
Perrot, E. Raphael . . . 1856
Peterson, Weatherill . . 1851
Pfromm, Adam . . . 1869
Phelps, Frederick H. . . 1869
Pile, Gustavus . . . 1866
Pile, Wilson H. Jr. . . 1861
Pleasants, Charles E. . . 1829
Pollard, Oscar . . . 1853
Pollit, Edmund . . . 1848
Potts, Robert B. . . . 1838
Powers, Thomas H. . . 1833
Pratt, William H. . . . 1856
Preston, David . . . 1865
Price, Ferris . . . 1869
Price, Richard . . . 1835
Proctor, Stephen . . . 1834
Procter, William Jr. . . 1837
Pyle, J. Lindley . . . 1853

Rambo, Milton . . . 1869
Ramsden, Robert . . . 1851
Ranck, John W. . . . 1865
Rand, Charles S. . . . 1850
Rankin, Alfred J. . . . 1861
Raser, William H. . . . 1868
Rau, Robert . . . 1866
Read, Charles B. . . . 1869
Reel, Joseph . . . 1861
Reeve, Richard M. . . . 1832
Remington, Joseph P. . . 1866
Reynolds, John J. . . . 1869
Rex, T. A. . . . 1862
Rhoads, Elam . . . 1861
Rice, William C. . . . 1868
Richards, Clayton F. . . 1861
Richards, George K. . . 1859
Richardson, Joseph G. . . 1857
Richardson, Nathaniel . . 1861
Ridgway, William T. . . 1869
Riley, Charles W. . . . 1866
Rincker, William H. . . 1865
Rittenhouse, Henry N. . . 1855
Ritter, Benjamin I. . . . 1840
Ritter, Bradford . . . 1852
Robertson, Henry E. . . 1869
Robinson, Edward T. . . 1853
Robinson, James S. . . 1869
Robinson, Joshua K. . . 1866
Robbins, Alonzo . . . 1855
Robbins, James W. . . 1859
Roche, William F. . . . 1867
Rohrbacher, Frederick . . 1857
Rohrer, Earl Penn . . . 1863
Ross, H. H. . . . 1866
Ruan, James . . . 1863
Rubincam, Charles E. . . 1865
Ruch, John H. . . . 1855
Rulon, Edwin . . . 1860
Rush, Charles S. . . . 1847
Rushton, Richard . . . 1838
Rutherford, Charles A. . . 1865

Santos, Charles A. . . . 1848
Savery, John C. . . . 1851
Savery, William Jr. . . 1853
Sayre, Lucius E. . . . 1866
Scattergood, George J. . . 1856
Scattergood, Joseph . . 1829
Scheller, Thomas K. . . 1861
Schellinger, Clarence M. . 1868
Schively, William H. . . 1842
Schmidt, Christian . . . 1862
Schultheis, Christian . . 1864

Schurk, Peter Jr. . . . 1857
Scott, Thomas J. . . . 1846
Seeger, Roland . . . 1859
Segner, William . . . 1866
Seiler, Robert H. . . . 1858
Selfridge, Matthew M. . . 1852
Senneff, Jacob, . . . 1862
Seuret, J. Pedro, . . . 1857
Seybert, Robert L. . . . 1868
Sharp, Robert C. . . . 1869
Sharpe, William, . . . 1826
Shaw, Joseph B. . . . 1868
Sheaff, John F. . . . 1853
Sheridan, John I. . . . 1860
Sheridan, Richard B. . . 1861
Sherman, Oliver G. . . 1858
Shick, Andrew J. . . . 1856
Shinn, James T. . . . 1854
Shinn, Samuel E. . . . 1850
Shinn, Walter, . . . 1839
Shivers, Charles, Jr. . . 1867
Shoemaker, Allen, . . . 1866
Shoemaker, Benjamin . . 1866
Shoemaker, Charles, . . 1866
Shoemaker, Richard M. . . 1862
Shoffner, John N. . . . 1868
Sholl, Alfred K. . . . 1847
Shreeve, Charles S. . . 1835
Shrom, Charles F. . . . 1853
Shropshire, Joseph B. . . 1868
Shryock, Allen, . . . 1868
Shugard, B. F. . . . 1868
Siddall, Francis H. . . 1856
Siddall, R. J. . . . 1861
Sillyman, Lewis T. . . . 1858
Simes, J. Henry C. . . . 1864
Simes, John W., Jr. . . 1836
Simes, Samuel, . . . 1833
Simes, Samuel, . . . 1867
Simes, Samuel F. . . . 1867
Simon, Matthias, . . . 1868
Simons, Charles W. . . 1838
Simson, William H. . . 1866
Simpson, George T. . . 1866
Smedley, Bennett L. . . 1862
Smith, Ambrose, . . . 1834
Smith, Benjamin R. . . 1846
Smith, Edwin R. . . . 1863
Smith, Ephraim K. . . 1861
Smith, Franklin R. . . 1829
Smith, Homer A. . . . 1868
Smith, Isaac Jones, . . 1830
Smith, Isaac W. . . . 1858
Smith, Jacob L. . . . 1844
Smith, Theophilus H. . . 1859
Smith, Wilson B. . . . 1865
Smyser, George M. . . 1862
Souder, Joseph A. . . . 1866
Southall, Turner H. . . 1853
Spencer, Hallam H. . . 1858
Stackhouse, David L. . . 1854
Stackhouse, George P. . . 1868
Stanhope, W. Bellingham, . 1856
St. Clair, Theodore A. . . 1862
Steele, Oscar, . . . 1849
Steen, James H. . . . 1857
Steever, Henry C. . . . 1854
Stein, Jacob H. . . . 1869
Stell, John J. . . . 1858
Stevens, Hennell, . . . 1853
Stiefel, Louis, . . . 1868
Stoever, Charles F. . . 1846
Stoever, J. Melancthon . . 1861
Stokes, Isaac W. . . . 1849
Storks, J. Scott, . . . 1869
Stratton, James, . . . 1851
Strehl, Louis, . . . 1866
Swaim, George M. . . 1867

Tait, Stewart, . . . 1867
Taylor, Alfred B. . . . 1844
Taylor, Alfred Lafayette, . 1847
Taylor, Harry B. . . . 1869
Taylor, Horace B, . . . 1857
Taylor, James, . . . 1867
Taylor, William, . . . 1851
Thomas, Edwin, . . . 1864
Thomas, Frank W. . . 1868
Thomas, Jason P. . . . 1863
Thomas, N. Spencer, . . 1847
Thompson, William, . . 1856
Thompson, William B. . . 1858
Thompson William H. . . 1854
Thompson, Samuel, . . 1834
Tilge, F. A. . . . 1863
Tilghman, John H. . . 1834
Tobey, Avery, . . . 1849
Tomlinson, Edwin, . . . 1863
Tourtelot, Frank T. . . 1858
Tredenick, John B. . . . 1863
Treichler, L Alpinus, . . 1869
Trimble, David, . . . 1834
Trimble, Joseph, . . . 1834
Troth, Henry M. . . . 1851
Tuller, Charles, . . . 1861
Turnbull, Lawrence, . . 1842
Turner, Joseph M. . . . 1836
Turnpenny, Joseph C. . . 1833

Unzicker, Charles B. . . 1869

Vandegrift, J. P. . . . 1867
Vogelbach, Edmund, . . 1865
Vogelbach, Hermann A. . 1860

Wagner, Joseph, . . . 1860
Walker, John T. . . . 1865
Walker, Thomas A. . . 1866

| | |
|---|---|
| Wallen, Jarvis R. | 1869 |
| Ward, John, | 1859 |
| Ware, Frank | 1869 |
| Ware, Samuel F. | 1869 |
| Warner, William H. | 1858 |
| Warner, William R. | 1856 |
| Watson, William J. | 1853 |
| Weatherly, Wm. Henry, | 1861 |
| Weaver, Thomas, | 1856 |
| Webb, Samuel W. | 1867 |
| Webb, William B. | 1845 |
| Webb, William H., M.D. | 1868 |
| Weber, Henry J | 1863 |
| Weichselbaum, J. | 1867 |
| Weideman, Charles A. | 1867 |
| Weiser, Thomas D. | 1858 |
| Welding, Watson J. | 1833 |
| Wells, James G. | 1860 |
| Wendel, Edward, | 1865 |
| Wendell, Frederick, | 1865 |
| Wendel, John, | 1860 |
| Wents, Silas H. | 1844 |
| Wenzel, William T. | 1855 |
| Wetherill, J. Bloomfield, | 1857 |
| Wetherill, Samuel, | 1842 |
| Weymer, Harry B. | 1869 |
| Whartenby, John A. | 1846 |
| White, James, | 1865 |
| Wiegand, Thomas S. | 1844 |
| Wiggan, George T. | 1848 |
| Wike, Albert D. | 1867 |
| Wilkins, Charles M. | 1848 |
| Wills, Clayton N. | 1862 |
| Wilson, Adam H. | 1856 |
| Wilson, Charles, | 1868 |
| Wilson, Edwin K. | 1869 |
| Wilson, James, | 1860 |
| Wilson, Pierre B. | 1858 |
| Wilson, William, | 1868 |
| Wirgmann, Charles, | 1869 |
| Winter, Jonas, | 1860 |
| Witmer David L. | 1862 |
| Wolfe, Isaac G. | 1869 |
| Woodruff, A. Dickinson, | 1838 |
| Woods, Charles, | 1861 |
| Woodward, Charles E. | 1867 |
| Worthington, Henry W. | 1838 |
| Wright, Peter T. | 1846 |
| Wyeth, John, | 1854 |
| Young, Joseph, | 1857 |
| Young, Joseph E. | 1855 |
| Zeitler, Edward, | 1858 |
| Zieber, Jacob B. | 1857 |

## SUMMARY.

| Year. | Graduates. |
|---|---|
| 1826, | 3 |
| 1827, | 1 |
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| 1863, | 22 |
| 1864, | 18 |
| 1865, | 29 |
| 1866, | 31 |
| 1867, | 42 |
| 1868, | 48 |
| 1869, | 48 |
| Whole number of Graduates, | 701 |

THE

AMERICAN JOURN

MARC

## ON THE PREPARATIO

By Emil Scheffer,

At the suggestion of a physi of Pepsin from the stomach of the ke a variety of experiments, which I wi of the readers of this Journal, and particu al profession.

Throughout my experiments I emplo chopp mucous membrane, which I dissected from clea pig's stomach. The first experiment was made by macerating the membrane with water, straining off the liquid, adding hydrochloric acid and subsequently glycerin, the latter partly to give it consistence, but principally on account of its antiseptic properties. The experiment was repeated a number of times, changing the proportions of membrane and menstruum; but it was found that by maceration with water alone too much mucus was dissolved, so that the liquid became quite gelatinous and did not clear itself, and therefore this process was abandoned. I next macerated the membrane in water, acid and glycerin mixed together, and obtained a preparation from which, on standing a few days, the mucus held in suspension was precipitated and was entirely separable by filtration, forming a clear liquid. At the same time the preparation loses a peculiar disagreeable odor, which seems to be characteristic of the mucus. This odor seems to be developed during the maceration of the membrane, as the fresh stomach does not possess more odor than fresh pork, and that this odor is peculiar to the mucus is evinced by the